

# THE IRON AGE

THE NATIONAL METALWORKING WEEKLY

July 6, 1950

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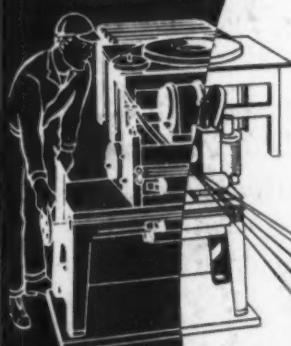
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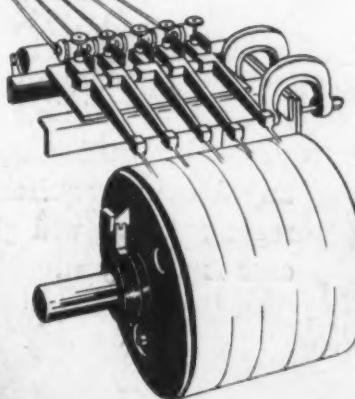
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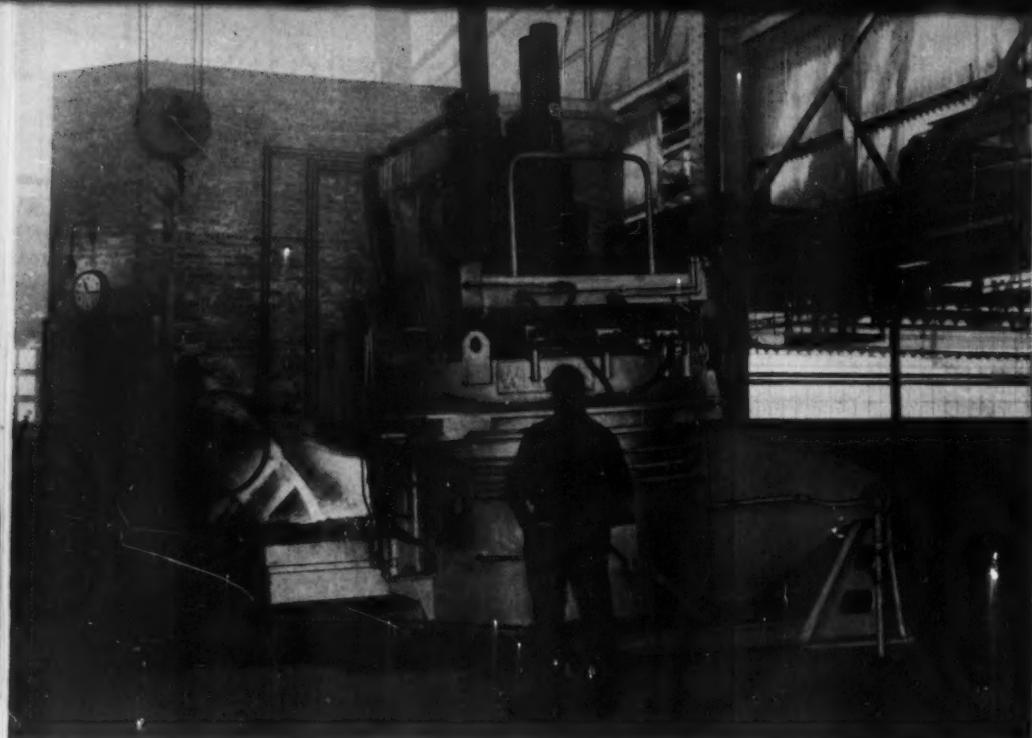


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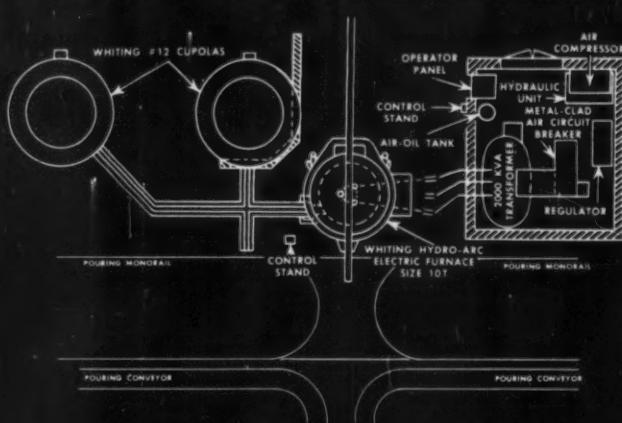
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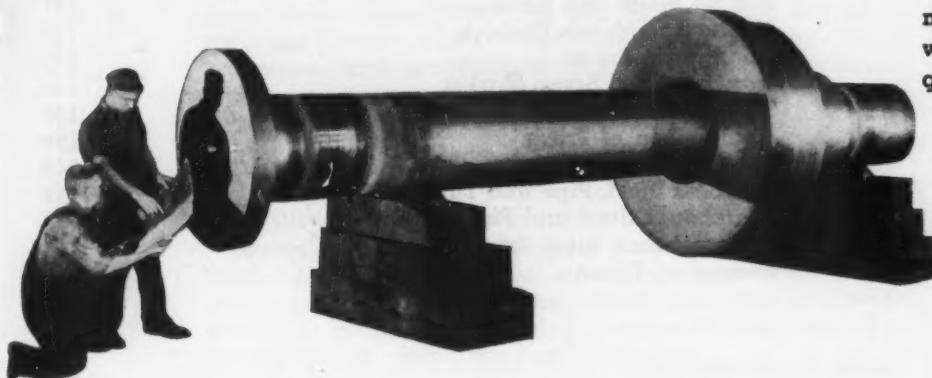
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Let's Be Vigilant	7
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**News Interpretations**

Newsfront	11
The Iron Age Summary	15
Machine Tool Highspots	31
On the Assembly Line	76
West Coast Progress Report	81
The Federal View	83

**Regular Features**

Dear Editor	22
Fatigue Cracks	26
Free Publications	36
New Production Ideas	40
Iron Age Introduces	72
The Economic Side, J. S. Lawrence	114
Construction Steel News	120
Dates to Remember	122
The Clearing House	164

**Technical Articles**

A Metallurgical Evaluation of SAE Tool Steels	85
Critical Factors in Investment Casting, Part I	88
Carbides Speed Machining of Chilled Iron Rolls	94
Radioactive Tracers for Gas Transit Times	96
ASM Meeting	97
ASTM Convention	99

**Spot News of Industry**

High Production -- For Peace or War?	107
Alcoa Unwraps Gas-Powered Pot Lines	109
Industrial Shorts	111
Canada Turns to U. K. for Needed Steel	112
Arma Demonstrates Player Piano Machining	113
New Skills for Industry in Puerto Rico	115

**Markets & Prices**

Market Briefs and Bulletins	131
Nonferrous Metals Outlook	132
Nonferrous Prices	133
Iron and Steel Scrap Market	134
Iron and Steel Scrap Prices	136
Comparison of Prices	138
Steel Prices	140
Stainless Steel, Pipe and Tubing Prices	142
Warehouse Steel and Pig Iron Prices	143
Miscellaneous Steel Prices	144
Ferroalloy Prices	150

Index to Advertisers	177
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Special Article.



The SAE has evaluated standard tool steels on a metallurgical basis. The new arbitrary ratings are relative within types of steels. Selection of a particular analysis by physical properties is possible with the assurance that each standard grade has a specific relationship with any other.—p. 85.

Issue Highlights



Accuracies of 0.002 to 0.005 in. can be obtained through control of critical factors in investment casting. Closer tolerances are possible in special cases. Text and photographs illustrate proper and improper die designs in part one of a two-part article.—p. 88.



Allis-Chalmers has adopted carbide tools for all machining operations on chilled iron rolls in order to partially offset higher labor and material costs. The result is increased accuracy, improvements in methods and equipment, and a substantial reduction of production time.—p. 94.



As a result of the tense international situation demands for high production are almost certain to be made on American industry. But only Stalin can say whether these demands will be for peace or war goods. High postwar production has left most of our industries in good shape to meet any emergency.—p. 107.



Alcoa's new aluminum reduction works in Texas is a high spot in the terrific growth of the natural gas industry. Alcoa pipes the gas into engines which turn generators which furnish electricity to the aluminum potlines.—p. 109.



A new electronic control using a player piano type roll made directly from blueprints was demonstrated last week by Arma Corp. Called "Armamatic," it is able to control transverse and longitudinal tool feeding mechanism.—p. 113.

Coming Next Week



Higher quality and lower costs have come from Pratt & Whitney Aircraft's wartime experience and postwar developments in barrel finishing. Small quantities of a wide variety of parts are now being processed. Experience has shown how to control the many variables.

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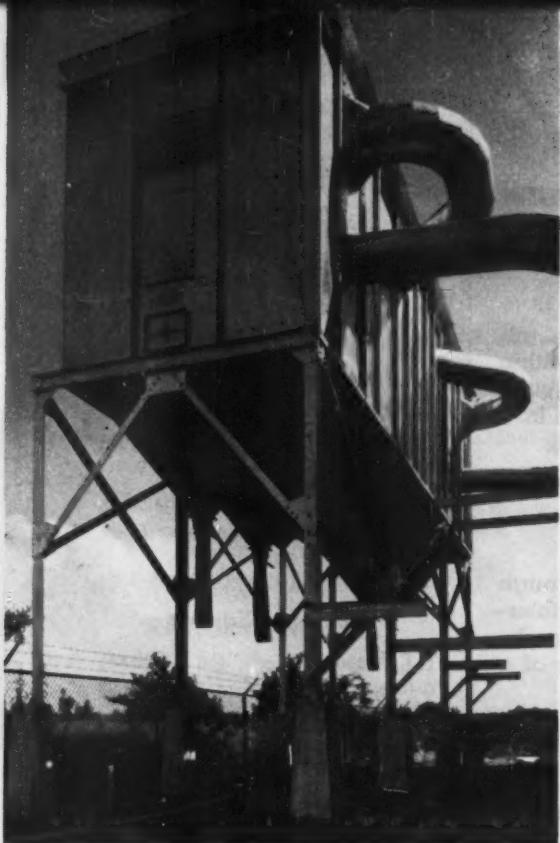
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Indexed in the Industrial Arts Index and the Engineering Index. Published every Thursday by the CHILTON CO. (INC.), Chestnut and 56th Sts., Philadelphia 39, Pa. Entered as second class matter Nov. 8, 1932, at the Post Office at Philadelphia under act of March 3, 1879. \$8 yearly in United States, its territories and Canada; other Western Hemisphere Countries \$15; other Foreign Countries \$25 per year. Single Copies 35¢. Annual Review Number, \$2.00.

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Wheelabrator" says:*

Punching Support Angle

OLD METHOD:

Layout time—three hours to layout 12 holes in each 50 angles.

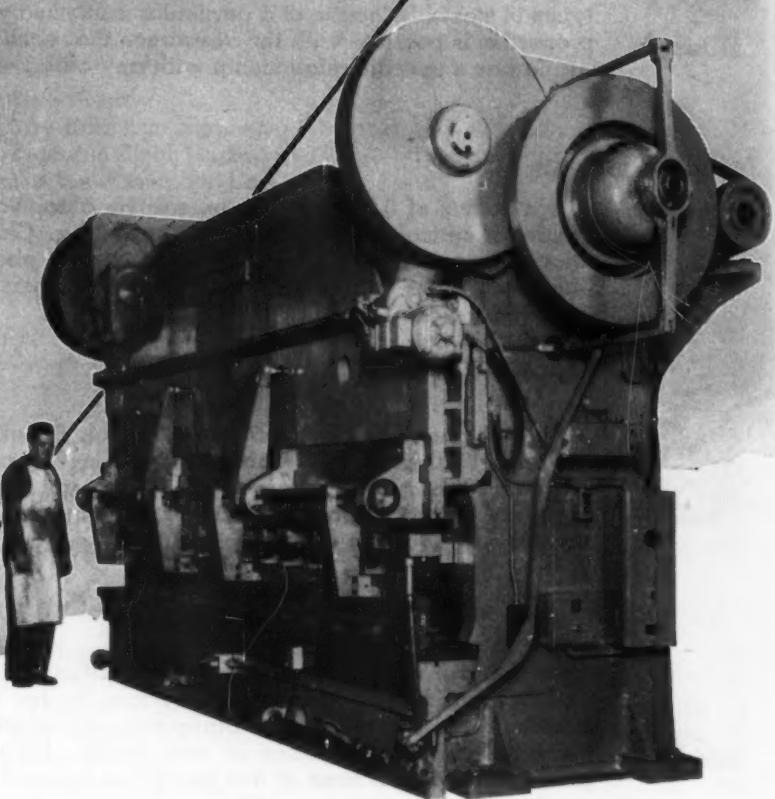
Punching time—25 pieces an hour total punching time, 2 hours for the 50 pieces.  
Total time—5.0 hrs.

CINCINNATI METHOD:

Layout time—none.

Punching time—1 1-10 hours to punch 50 pieces.

Total time—1.1 hrs.



Substantial cost reductions per piece have been effected in the punching of structural channels ranging from 3" to 8", and angles up to 5" x 5" on this 120 Series 12' Cincinnati All-Steel Press Brake. This entire range of work is handled with two sets of quickly interchangeable punching blocks.

Location and spacing of holes are maintained accurately throughout all operations with substantial reduction in subsequent assembly costs.

If you punch, form or bend, write our Engineering Department. They will gladly cooperate in lowering the cost per piece in your shop.

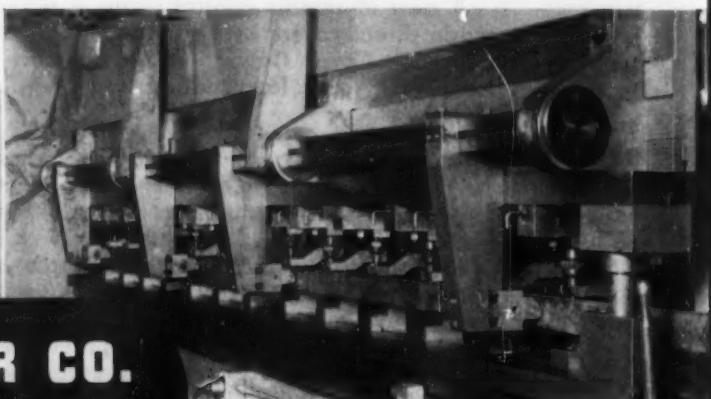


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# Editorial

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## INDUSTRY VIEWPOINTS

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### Let's Be Vigilant

**Y**OU are going to hear a lot about controls in these days of international crises. Some people are going to say we need more; that business can't take care of itself; that in the interest of the country we must control this or that.

Already there is talk that prices ought to be controlled. Well they don't need to be controlled at all now. We are not at war yet and we may not be for some time—if at all. But there will be a lot of people who will use the war scare to get their hands on more power.

We are going into a period where a powder keg may be the seat for management. We may have to fight more and more to preserve independence in business and freedom for economic laws. Only that way can this country be in a fit position to take care of any serious crisis that may come.

The thing that worries us is that with the first sign of a tough international problem we always have a lot of people who want us to bind ourselves under something which we are fighting against—regimentation.

If the time comes when we really need controls to protect our way of doing things, that will be time enough for governmental interference. But we should not stand by and see some people use the present international scene as an excuse to tell industry what to do.

We have a mighty industry in America. We have big companies and small companies. Working together they furnished the material for the armed forces to win the last war. They can do it again—if they have to.

But there is no reason to believe that government people can run industry as well as businessmen themselves—there is a lot of evidence to the contrary. Maybe we are a little premature in our worries. But to be premature is a whale of a lot better than being taken by surprise.

No one wants a world of peace more than business does. Only by such a peace can we reach greater and better heights in living. But business, as much as anyone, wants to protect the free and unfettered way of living, working, loving and even dying.

Beware of the man or woman who wants to be controlled or wants to control others because he is afraid. That is what we are trying to prevent in this world.

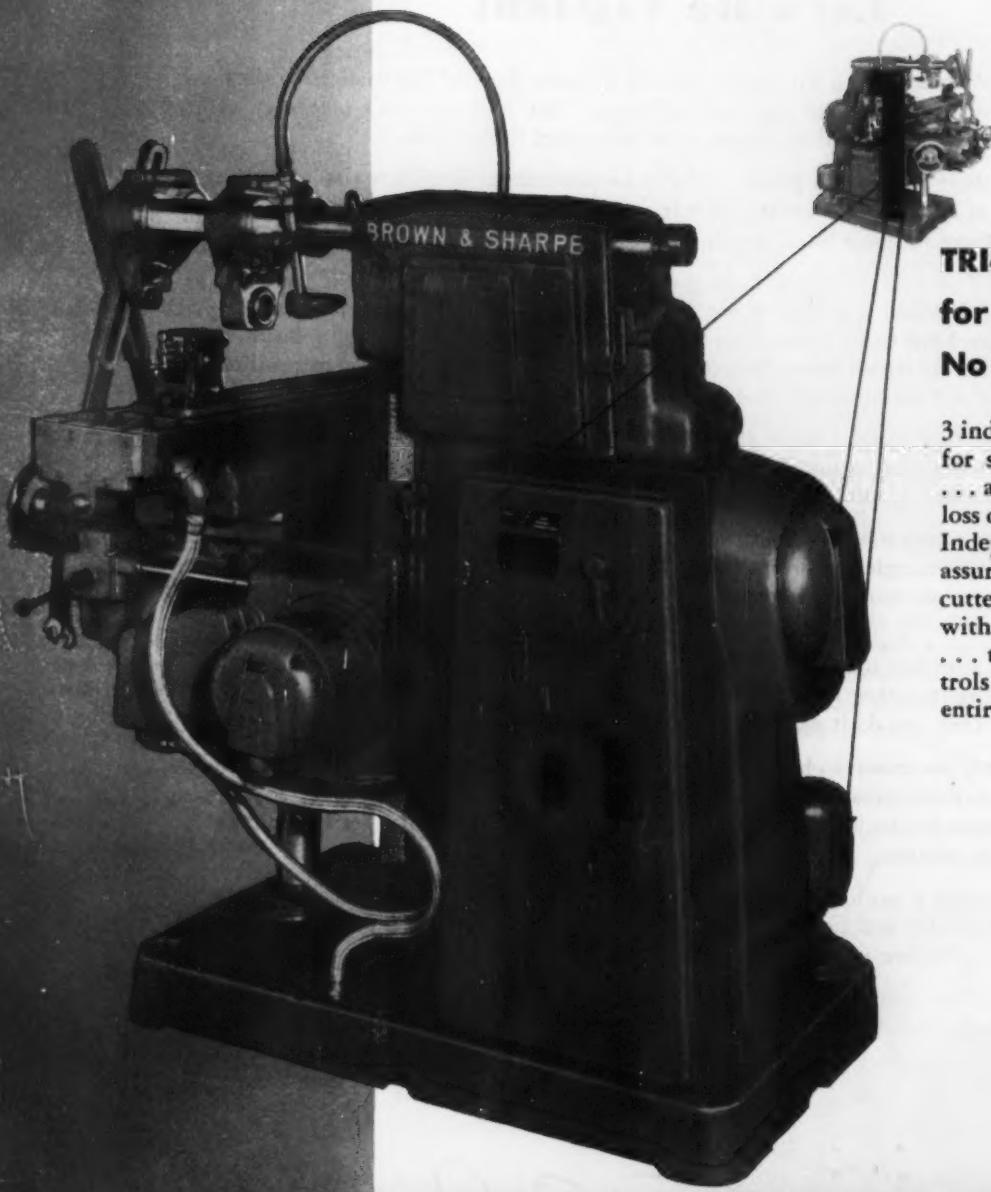
*Tom C. Campbell*

Editor

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No. 2 Plain Milling Machines



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3 individual driving motors . . . for spindle, table and coolant . . . advantageously placed, save loss of power within machine. Independent spindle motor assures full power for driving cutter. Feed motor coordinated with spindle driving motor . . . thus start-stop lever controls not only spindle motor but entire machine. All-gear drive.

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## NEWSFRONT

NEWS, METHODS AND PRODUCT FORECAST

- Two large steel companies are negotiating for iron ore rights in Venezuela. Theirs will probably turn into a joint effort in an attempt to corral a large part of San Isidro. This mountain may contain as much as half a billion tons of high grade iron ore. Negotiations are going forward with the Venezuelan government and a definite decision may be forthcoming soon.
- Several railroad diesel engine builders have switched to silicone rubber for the seals between cylinder block and cylinder liners where one side of the seal is attacked by oil, the other by hot water. Formerly engines had to be taken out of service after 200,000 miles, just to replace the seals; no other parts needed overhaul. Now engines run 500,000 miles between overhauls.
- A low titanium metal performs well in wet chlorine but cannot be used in dry chlorine applications. It ignites in the presence of the dry gas.
- Successful blending of high abrasive carbon blacks and synthetic rubber in latex or liquid form results in about 7 pct more wear for automobile tires.
- Steel mill maintenance is being done on the fly these days. Some finishing mills are being repaired or modernized while production goes forward. In some cases the entire maintenance department is monopolized during a short shutdown to do the job in a fraction of the time that used to be considered normal. This latter type of miracle-working extends from the openhearts to the finishing mills.
- The Belgians have taken orders—at less than domestic prices—for big tonnages of bale ties throughout the South. There is some concern about their ability to deliver on time. If they don't meet delivery promises a lot of cotton will go unbaled.
- A new steel has proved itself in high strength plate applications requiring high weldability. No pre or post heating is required, even in heavy sections. It has a minimum of 100,000 psi yield strength at 0.2 pct offset. It contains nickel, copper, molybdenum and about 10 pct vanadium.
- The trend to 19-in. television tube screens is so strong that at least one big set maker has cancelled orders for 16-in. tubes and is now specifying 19-in. tubes.
- Front surface mirrors with aluminum reflecting surfaces are recommended for maximum or precise reflectivity following Army Engineer research studies at the Ft. Belvoir laboratories.
- An old process may stage a strong comeback. Pure lead coating of steel for severe cold drawing is old but a new fluxing agent appears to have improved this lubricant's performance.
- Recently developed is a zinc alloy said to have eight times the useful strength of any similar alloy now in use. Major component is zinc, with small quantities of copper and beryllium added. It is claimed to have the same strength as brass and to be less expensive.

# MEEHANITE® CASTINGS



ALL UNITS built by American Laundry Machinery Co., Rochester, N. Y., are designed to incorporate the "better property" characteristics of Meehanite castings. The American Notrux Extractor illustrated is a good example offering users increased efficiency and a smooth, high-speed machine which will provide long, uninterrupted service.

Typical of the important Meehanite parts are the following:

1. Curb and Floor Base.
2. Legs.
3. Motor Bracket.
4. Basket Comb.
5. Sheave and Brake Drum.
6. Bearing Housings.

The variety of these parts and their important functions are indicative of proper design analysis and the recognition that only through the assurance of quality castings can all service requirements be met.

Your equipment can take advantage of the uniformity and dependability built into Meehanite castings.

For further information write for the Meehanite Handbook, 67 pages of important engineering data, to any of the foundries listed.

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# The Iron Age

## SUMMARY

### IRON AND STEEL INDUSTRY TRENDS

**A**MERICAN industry this week is facing one of its greatest challenges. It knows that it will be called upon for high production for many months to come — but it doesn't know whether the production will be for war or peace. It has to be alert to shift its production with trigger quickness. It has to marshal strategic material, skilled labor and energetic management to meet demand.

The steel industry is ready for war or peace. In 1941 the nation's annual steel capacity was 81.6 million ingot tons. Capacity today is about 100 million tons—and it isn't stopping there. Steel companies are still expanding at an average annual rate of more than 2 million tons. Carbon steel products could effect a changeover to a wartime footing almost overnight. But alloy products would probably encounter some problems resulting from large scale demand for special heat resisting alloys required for jet aircraft.

#### Consumer Demand High

The keynote is Washington. No major industries will start changing over until or unless Washington sets the pace. So far there have been no directives for accelerated military ordering, allocations, priorities or any of the other wartime controls. They will not be needed unless the military situation changes. But the ground work is being laid this week for initiating them if and when they are needed.

Regardless of the international situation, civilian demand for peacetime goods will be insatiable in many lines. People who had held back from buying automobiles, refrigerators, washing machines and other items will now rush into the market, lest stark military necessity deny them such purchases for a long time.

Basic steel is in greater demand than ever and all the expensive ways of obtaining additional tonnage are becoming more attractive. Items like plate and bars that were fairly easy 60 to 90 days ago have been added to the critical list. It has been estimated that as much as 25 pct of all

steel used in the automobile industry, for example, is coming in at more than mill prices. This includes warehouses, conversion, scrap deals and premium prices.

#### Predicts 8 Million Cars

This should be viewed in connection with an authoritative prediction that the auto industry will build 8 million cars and trucks this year. Such a record would be head and shoulders above any previous accomplishment. But this same source has been uncannily accurate in the past. The tip-off for the future is that automobile output for the first half comes to 3,724,000 vehicles.

Although there has been no official word of government-sponsored industrial mobilization, one large steel company has started trimming allocations of plate.

The trend in steel prices is still up. Two large producers of stainless steel have increased their prices as a result of rising costs of nickel and other items, as predicted by THE IRON AGE. Increases amount to about \$20 to \$30 dollars per ton. Other producers are expected to follow.

Steel production men are becoming more and more concerned about rising costs. Scarcely a week goes by but what some ingredient in steel-making is increased in price. These costs are piling up. As a result, some steel items are now being produced without profit. This is building pressure under the general steel base price level, in spite of the fact that most steel companies have officially denied that they are contemplating a general price increase.

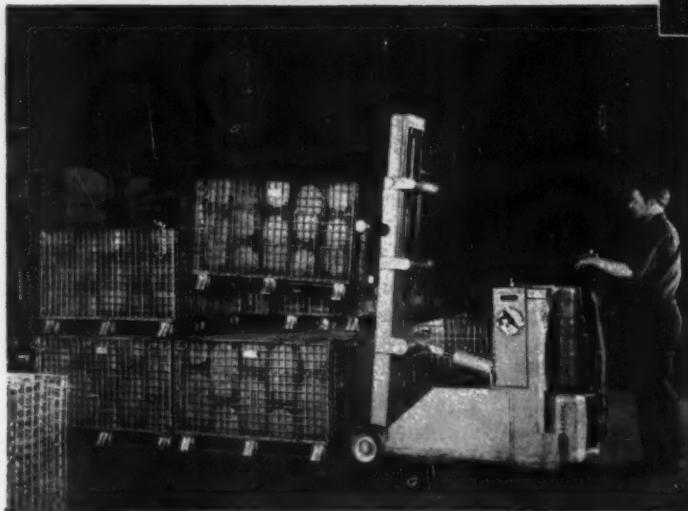
#### Scrap Marks Time

This week the scrap market was marking time. The downward trend of the past 3 weeks has been slowed and trade sources believe that the period of stabilization will continue until the international climate clears.

Because of the Fourth of July holiday, steel-making operations are estimated at 92 pct of rated capacity, down 9½ pct from last week's figure.

(Nonferrous summary, p. 132)

**Pittsburgh**  
**CARGOTAINERS**  
**Speed Operations**  
**and Reduce**  
**Handling Costs**

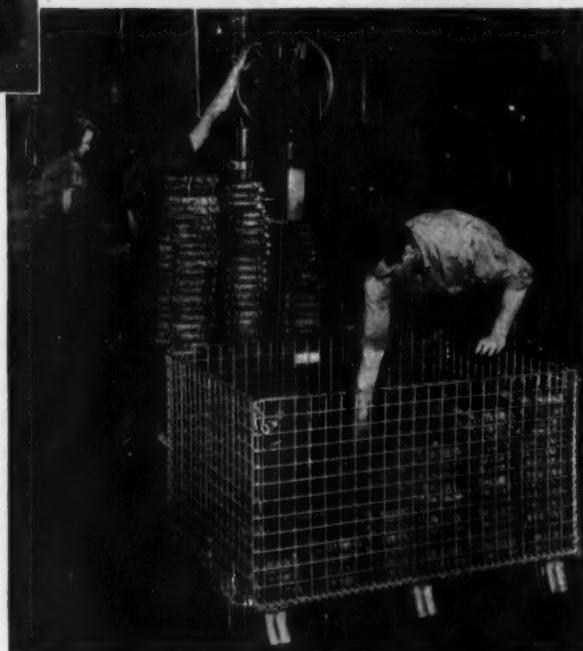


CARGOTAINERS in above photograph are received at assembly plant from vendor—are easily unloaded directly from truck to storage space. Note ease of stacking and minimum of storage space required, also the variety of parts that pack easily in CARGOTAINERS.

*At right, CARGOTAINERS again save additional handling time and costs at end of machining process on castings. Parts are easily packed back into CARGOTAINERS and moved to storage to await final assembly. The awkward gap between vendor and assembly plant is easily bridged with versatile, maneuverable CARGOTAINERS.*

For further information on Pittsburgh CARGOTAINERS, write Pittsburgh Steel Products Company, Department IA, Grant Building, Pittsburgh 30, Pa.

*Above, CARGOTAINER being loaded into delivery truck at vendor's holds 345 castings—more than 2700 lbs. Previously only 88 castings weighing 704 lbs. were handled in odd size drums by one man in the same amount of time. Uniform size of CARGOTAINERS allows easy stacking after castings are loaded—also affords more efficient handling from inspection through shipping.*



**CARGOTAINERS**

*by*

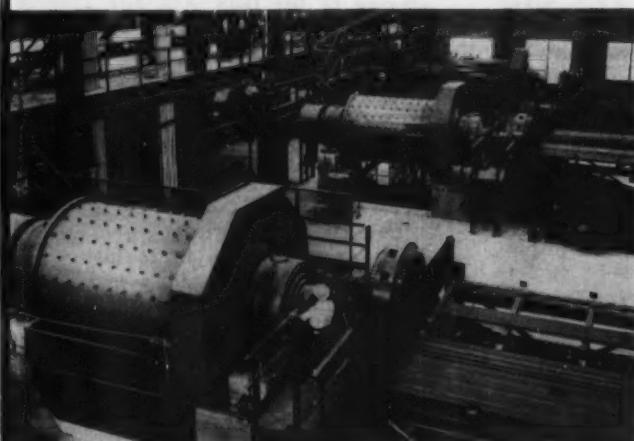
**Pittsburgh Steel Products Company**  
 Subsidiary of  
 Pittsburgh Steel Company



**3** TOUGH, ABRASIVE, LOW GRADE iron ores are crushed in high output primary gyratory and jaw crushers. This 60-in. Superior-McCully crusher is in use in the Lake Superior region. Write for Bulletin 07B6004 for complete details on this type of crusher.

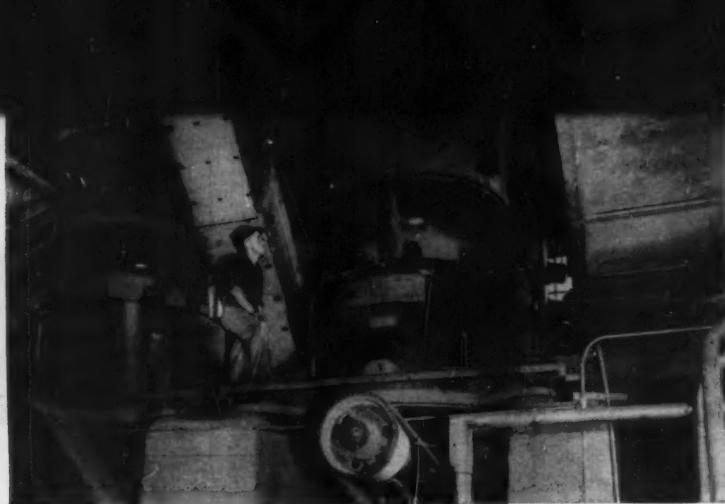


**5** THESE LOG WASHERS are used to remove silica and medium sticky clay from crushed iron ore. Contra-rotating steel paddles produce a scuffing, scouring and sluicing action. Allis-Chalmers makes all basic types of washing equipment. See Bulletin 07B6411.

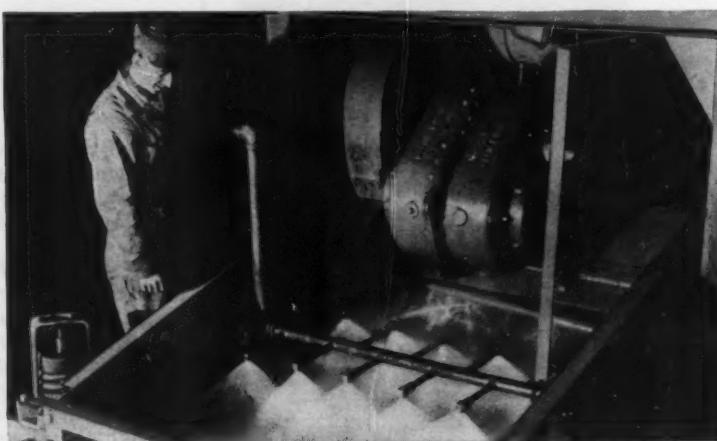


**7** IRON ORE IS FINELY GROUNDED in three A-C 8 ft x 12 ft rod mills ahead of magnetic separation at this Adirondack plant. A-C builds five separate types of grinding mills to meet varying plant requirements. Request Bulletin 07B6718 for full details.

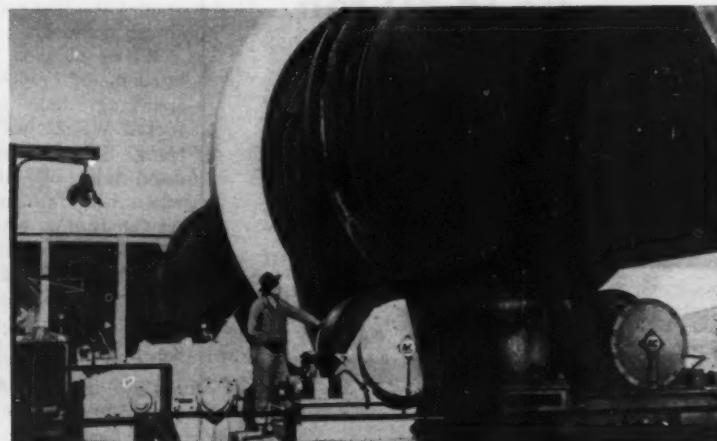
EQUIPMENT FOR IRON ORE BENEFICIATION: Hoists . . . Jaw and gyratory crushers . . . Vibrating screens . . . All types of washers . . . Concentrating jigs . . . Grinding mills . . . Rotary kilns and coolers . . . Centrifugal pumps . . . Texrope V-Belt drives and sheaves . . . All types and sizes of Electric motors . . . Starters . . . Complete power generation, distribution, control equipment. Write for literature.



**4** FINE REDUCTION of the iron ore is often accomplished with Hydrocone gyratory crushers. Two are seen working in parallel at this Adirondacks iron mine and beneficiation plant. Write for Bulletin 07B7145 for complete description and operating data.



**6** IN CONCENTRATING IRON ORE by the heavy density process, Low-Head vibrating screens are widely used for recovering media. The first screen section drains the media while the second section washes at this Minnesota plant. Write for Bulletin 07B6330.



**8** NODULIZING OF BENEFICIATED IRON ORE so that it can be used efficiently as blast furnace feed is the job of this Allis-Chalmers 11 ft, 6 in. x 300 ft rotary kiln at a southern iron mine and beneficiation plant. Bulletin 07B6368 contains full description.

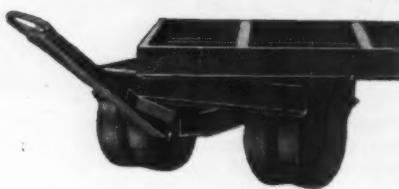
# ALLIS-CHALMERS

*Power, Electric, Processing Equipment for Iron and Steel*





## Trucks and Trailers



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Built with 80 years of skill by pioneers in the industry. Over a hundred standard two, four, and fifth wheel trucks and trailers. Special units designed and built to your specification. Complete engineering service.

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794 Congress St., Columbus 16, O.



## Fatigue Cracks

By CHARLES T. POST

### Blessed Event

Almost anything can happen in the pages of your favorite family journal, including childbirth. When we whispered back on May 12, that a blessed event was impending, propriety forbade naming any names. But this week, if you'll turn back to page 135, you'll see that Keokuk Electro-Metals' Chief Keokuk and his bride, né Princess Wenatchee, now are three.

The Chief had been roaming through the advertising pages for some time when he discovered Princess Wenatchee. The May 5, 1949 issue carries the announcement of their wedding. By pure coincidence, Keokuk Electro-Metals opened its Wenatchee, Wash., plant simultaneously.

We're pleased to note that the burden of motherhood, literally speaking, has not adversely affected Wenatchee's obvious attractions. She's a nice girl even if she does take off her wedding ring when the Chief goes out of town. As for Junior, what a kid! A tooth already, and waving a 12½ lb piglet with one hand.

### Keep the Mails Clean

Rep. Edwin Arthur Hall will probably be enshrined as a hero by post-office employees. Noting that there was nothing pressing occupying the collective mind of Congress, he introduced a bill a couple of weeks ago "to provide adequate washup time."

The proposed legislation would allow 10 min before lunch time "for the purpose of preparing to go to lunch" and 15 min prior to quitting time "for the purpose of preparing to go home for the day."

If the post-office is anything like most business offices, this merely formalizes existing practice. With-

out putting it down in writing, the postal employees of course will need another 10 min to prepare to go to lunch and 15 more in the afternoon to prepare to prepare to go home for the day. After all, we can't have the postmen running around with perspiration on the brow or shiny noses.

### Found—350 Tombs

The press clipping bureau which, for a fee, documents the appearance of your f.f.j.'s name in the public press, hands us this A.P. dispatch from the Terre Haute, Ind., Star:

*"A group of 350 tombs belonging to the IRON AGE has been discovered in the area of Realmesi, near Enna, Sicily."*

We can see that we must be more careful the way we toss our tombs around from now on. Never know where they're going to be picked up.

### Puzzler

Until answers come in to last week's puzzle, and we don't look for them until along about next winter, we'll have to be content with tabulating additional returns on the long division-code problem from the June 15 issue. If counter-intelligence needs cryptographers, it can call on George S. Chadwick, Jr., Carbide & Carbon Chemicals Division; Carlos Miller, Jr., of Raytheon Mfg. Co.; R. C. Martin, Ford Motor Co. of Canada; or C. E. Blass of Talon, Inc.

Here's another grazing cow problem, similar to last week's, but E. J. Sampson, who submits it, provides an answer: A cow is grazing in a 200 ft diam circular pasture, tied by a rope to a post in the surrounding fence. She can graze over exactly one-half the area of the pasture. How long is the rope?

THE IRON AGE

# MACHINE TOOL

## High Spots



*Sales  
Inquiries  
and Production*



By W. A. LLOYD

**Shaky War Footing** — The machine tool industry, a most critical one in wartime, is in a less favorable position today than it was in 1941 to take on an all-out defense program. Industry spokesmen estimate that it would be 18 months to 2 years before machine tool builders could be back on a full-scale wartime footing.

The National Machine Tool Builders Assn. gives these reasons: (1) Lost capacity since the end of World War II, (2) Even though business showed a 10 pct gain in the first 5 months of this year over 1949, the industry is operating at about the 1939 level, (3) For 3 years before Pearl Harbor, a heavy volume of foreign business had served as a warm-up for the big job ahead. Today the industry would not have this running start that put them into the World War II race with such success.

**Optimism vs. Realism** — On the bright side is the tentative production schedule laid out for the industry by the Tools Div. of the National Security Resources Board. Machine tool builders have this program in their files, will know just what to do should it be necessary to put the plan into effect.

There would be less uncertainty and loss of motion than in 1941. This program calls for the production of approximately 100,000 machine tools in 6 months. The NMTBA believes this is too optimistic, figures the job would take from 18 to 24 months.

**Tolerances Trouble** — The industry is afraid, too, that it will not be as easy to find qualified subcontractors as it was during the war because closer tolerances are required in the manufacture of improved machine tools.

Since the war ended, machine tool builders have had to contend with many problems, including: (1) War surplus machines, (2) The Treasury Dept.'s outmoded policy on depreciation—a policy that the NMTBA insists is discouraging replacement of machines, (3) ECA's policy of encouraging Marshall Plan nations to build up their own machine tool industry, plus the difficulty of obtaining licenses of export to certain countries.

**By the Wayside** — In the last 5 years, some 38 machine tool build-

ers have dropped out of the picture, either through outright failure or through absorption by larger, more successful companies.

The NMTBA says that today only two companies remain which are capable of producing the very large machine tools, compared with ten such companies in the early twenties. Industry employment dropped from a peak of 122,600 in January 1943, to 36,600 last March, according to the Bureau of Labor Statistics.

**Vary Production** — Some companies have managed to keep going by diversifying their production. They are building such equipment as agriculture machines, knitting machinery, road building equipment and the like. This serves a dual purpose — keeps skilled workers on the payroll and keeps plants running more efficiently.

**Sales Stimulus** — To encourage faster replacement by machine tool users, the industry has sponsored a sales program, has trained 650 salesmen since 1947.

These salesmen are qualified to show the machine tool user how he can save money by trading in his old machine for a more efficient product.

**Four Year High** — Order volume in the first 5 months of 1950 was about \$151,000,000, as compared with \$136,000,000 in the same period last year, a gain of a little more than 10 pct. Orders during May represented a 4-year high.

Intense tooling activity in the automobile industry has been a major contributing force behind this upsurge. Detroit sources indicate that builders of special machine tools, including transfer-type machines, have been particularly active. There has also been a substantial amount of buying for tool rooms. The outlook for the remainder of the year is bright.

The new Oldsmobile program created quite a stir in the industry. It calls for the purchase of 100 machine tools, and much additional new equipment.

# Stop Grinding Tie-Ups...

## Spot These Grinders Around Your Shop



Buy BLACK & DECKER—  
the Complete Bench Grinder Line!

\*Trade Mark Reg.  
U. S. Pat. Off.



6" Heavy-Duty  
1/3 H.P. \$58



8" Heavy-Duty  
1/4 H.P. \$98



10" Bench Grinder  
1 H.P. \$138



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Wire Wheel  
Brushes  
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Eye Shields



Back-Stand  
Idler

Grinder  
Pedestals

ONLY  
\$38

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by having your men lined up waiting to use a Bench Grinder . . . when you can keep jobs moving by spotting enough Black & Decker 6" Standard Bench Grinders around your shop?

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you can afford to have B&D 6" Standard Bench Grinders within easy reach of all your workers . . . to save steps, save time, save money!

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\$38

**Speed Up** tool sharpening, "run - of - shop" grinding jobs, cleaning, burnishing, buffing!

ONLY  
\$38

**Many Practical Features** you wouldn't expect to find at such a low price . . . B&D-built  $\frac{1}{4}$  H.P. constant-speed motor; full-size ball bearings; steel wheel guards; adjustable tool rests locked in base grooves; new styling for better working clearances!

ONLY  
\$38

**See Your Nearby B & D Distributor** for details on 6" Standard Bench Grinders, other models for heavier duty, many accessories. Write for free catalog of over 100 Portable Electric Tools to: THE BLACK & DECKER MFG. CO., 651 Pennsylvania Ave., Towson 4, Maryland.

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PORTABLE ELECTRIC TOOLS

SOLID STEEL  
HEADS, CAPS  
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**HYDRAULIC CYLINDERS**  
*Meet J. I. C. HYDRAULIC STANDARDS*



Benefits to You  
No Broken Castings  
No Scratch-Damage  
to Piston Rods,  
Bushings and Seals  
**NO COSTLY  
"DOWNTIME"**  
**NO REPAIRS**  
**NO MAINTENANCE**  
**NO POWER WASTAGE**

Years before the Joint Industry Conference (J. I. C.) Standards for specifying "quality" hydraulic equipment were adopted, the *standard* design and construction features of Miller High Pressure Hydraulic (2000-3500 psi) Cylinders already included ALL the specifications for cylinders, seals and pistons now called for by the "Standards". Hard chrome plated, scratch-resistant piston rods and dirt wipers have long been standard Miller cylinder features yet are required by the "Standards" only under severe conditions.

Solid steel heads, caps and mountings which eliminate costly, dangerous breakage even under the severest operating conditions represent an "extra-quality" standard Miller cylinder feature which actually exceeds the high quality set by the J. I. C. Standards.

The Miller "Patented" Hydraulic Piston Rod Seal which has no manual adjustment and is automatically self-adjusting and wear-compensating to give life-long leakproof service without ever requiring any manual adjustment whatsoever . . . far surpasses the requirement of J. I. C. Standard H6.2.5 which specifies "Stuffing boxes for automatic packing shall be so designed as to prevent adjustment beyond the functional limits of the packing"

Write for illustrated cylinder bulletins A-105 and H-104

COMPLETE MILLER CYLINDER LINE INCLUDES: AIR CYLINDERS, 1½" to 20" BORES, 200 PSI OPERATION; LOW PRESSURE HYDRAULIC CYLINDERS, 1½" TO 6" BORES FOR 500 PSI OPERATION, 8" TO 14" BORES FOR 250 PSI; HIGH PRESSURE HYDRAULIC CYLINDERS, 1½" TO 12" BORES, 2000-3000 PSI OPERATION. ALL MOUNTING STYLES AVAILABLE.



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## PUBLICATIONS

### Facts on Thread Rolling

History and development of thread rolling, along with a discussion of the process, is detailed in a new 16-p. bulletin. Advantages of accuracy, strength, uniformity and smoothness are covered, pointing out also how the process saves both time and material. A variety of parts manufactured are illustrated to show versatility of thread rolling for forming threads in a wide range of materials and for performing several non-threading operations. Different models of Reed cylindrical die thread rolling machines with manual or automatic work handling are shown, and Reed flat and cylindrical thread rolling dies are presented. *Reed Rolled Thread Die Co.*

For free copy insert No. 1 on postcard.

### Steel Cabinets

Specifications and illustrations of Stansteel cabinets, lockers, shelving and parts bins are presented in a new 16-p. catalog. Other special equipment is described, and examples of a few recent large installations are shown. The booklet explains how basic units may be adjusted to fit any requirement in any combination. *Standard Steel Equipment Co., Inc.*

For free copy insert No. 2 on postcard.

### Metal Bending Shown

Commemorating the company's 50th anniversary, a new 60-p. catalog describes Wallace bending machines. Essential data on bending are presented, and information for use in conjunction with ram or

New publications that describe money saving equipment and services are available free and without obligation. Copies can be obtained by filling in the attached card and mailing it.

press type benders is contained along with other useful engineering notes. One section is devoted to a description of bending ductile metals, and special examples of bending are illustrated. The catalog covers bending equipment in a wide range of sizes, types and capacities. Part of the catalog is devoted to subsidiary companies dealing in warehousing and fabrication of pipe and tubing. *Wallace Supplies Mfg. Co.*

For free copy insert No. 3 on postcard.

### Rust Prevention

The line of No-ox-id waxy and oily type coatings are described in a new series of data sheets. Such information as description and type of coating, physical characteristics, uses, coverage, preparation of surface before application, method of application, drying time, removal and other features is presented, showing how these rust preventatives can be used for complete protection in all phases of the metals industry. *Dearborn Chemical Co.*

For free copy insert No. 4 on postcard.

### Disk Grinding Discussed

Safe handling, storage, mounting and use of abrasive disks for disk grinding are some of the points covered in a new 18-p. booklet, which describes features peculiar to this type of precision grinding. Clear-cut drawings illustrate cor-

rect procedure and several protection devices are described. *Grinding Wheel Institute.*

For free copy insert No. 5 on postcard.

### Metalworking Contractor

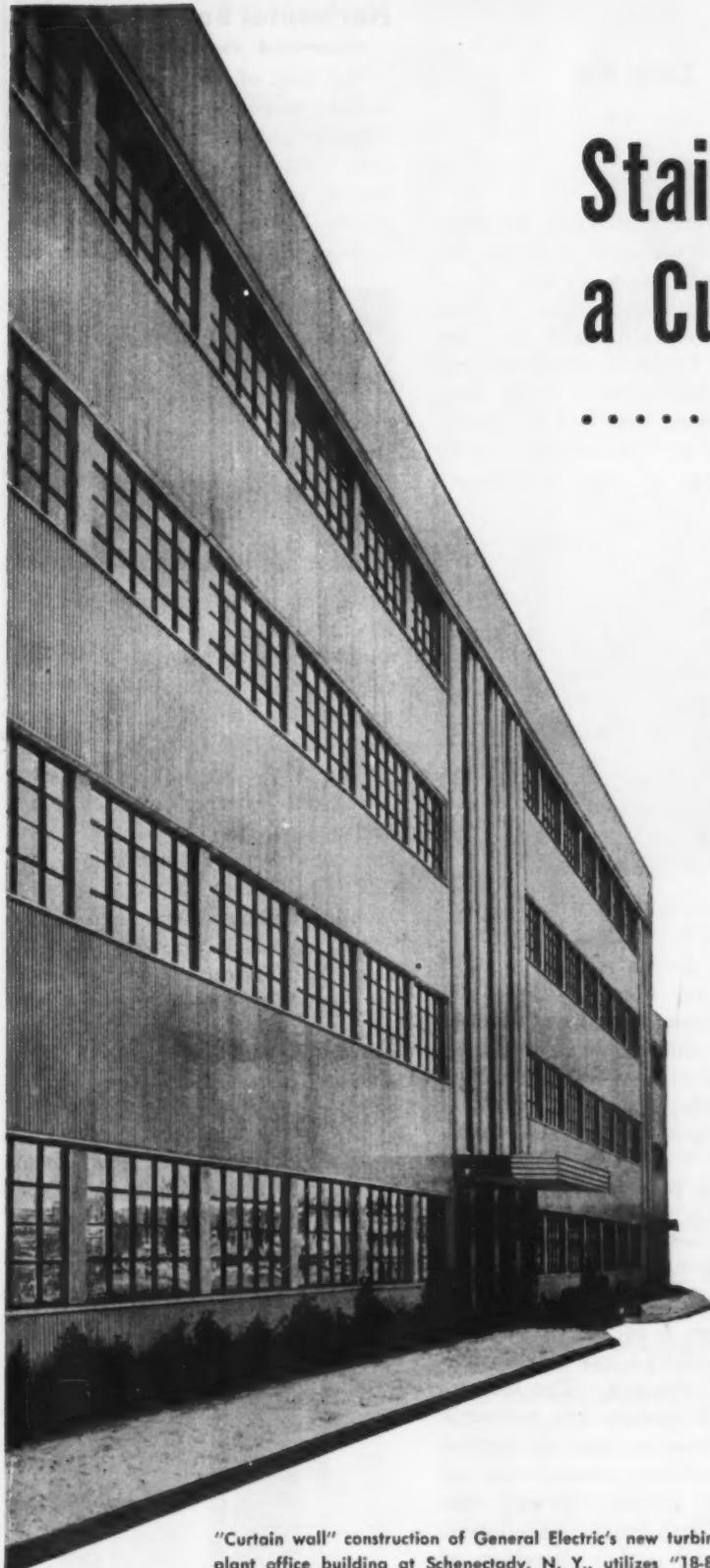
Illustrations of many sheet metal parts produced under contract for other manufacturers are contained in a new 12-p. filing-size booklet. This material is intended primarily for manufacturers whose products embody parts or assemblies of any of several sheet metals, fabricated by various processes and finished in vitreous enamel, synthetic enamel, paint, hot-dip metal coatings, lacquer or polishing. The many facilities available are described, as well as the economic advantages of such arrangements for the customer. *Contract Mfg. Div., Geuder, Paeschke & Frey Co.*

For free copy insert No. 6 on postcard.

### Small Motor Reference

Greatly condensed and simplified to serve as a handy reference in solving application problems, a new easy-to-use catalog features fractional horsepower motors. Over 200 specifications are listed to fit almost any fractional horsepower requirement, including plain and speed reducer motors in all popular winding classifications. The catalog also contains such helpful information as connection diagrams,

Turn to Page 124



# Stainless Steel gets a Curtain Call...

## ..... CUTS CONSTRUCTION COSTS

Designers had no precedent when building this wall...

*But...* by hanging prefabricated chromium-nickel stainless steel panels on a structural steel skeleton, they helped to start a new trend in the erection of building exteriors.

In fact, the light weight of the thin, high strength stainless panels used for curtain walls of this building permitted the addition of an extra floor... without strengthening the original foundations. Use of these panels provides simple, rapid construction, increases floor space and substantially reduces maintenance and depreciation.

This is just one of the many applications in which stainless steels are entering into new and ever-widening fields of usefulness... in architecture and decoration as well as in the process industries and transportation.

Today, hundreds of companies are setting new standards of low-cost performance by using austenitic chromium-nickel stainless steels for all sorts of applications. You can draw, spin, forge, weld, solder, punch, shear or bend these versatile alloys. Their strength, and corrosion resistance promote long, trouble-free performance of equipment in many fields.

Leading steel companies produce austenitic chromium-nickel stainless steels in all commercial forms. A list of sources of supply will be furnished on request.

"Curtain wall" construction of General Electric's new turbine plant office building at Schenectady, N. Y., utilizes "18-8" chromium-nickel stainless steel supplied by Allegheny Ludlum Steel Corp., Pittsburgh, Pa. Some 30 alloy steels... each identified by its American Iron and Steel Institute number... carry the family name "Stainless."



**THE INTERNATIONAL NICKEL COMPANY, INC.** 67 WALL STREET  
NEW YORK 5, N.Y.

# NEW

## PRODUCTION IDEAS

Continued

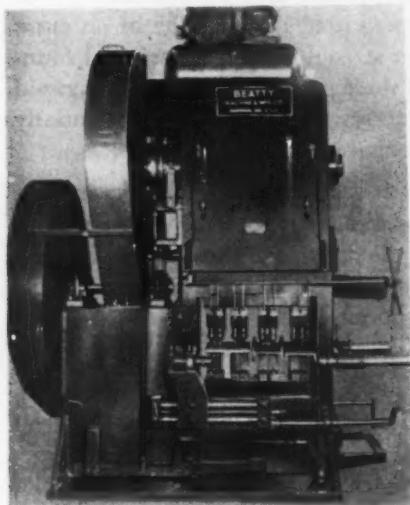
are totally enclosed in a metal housing. Electrical equipment of permissible type is explosion proof for safe use in gaseous working in accordance with U. S. Bureau of Mines standards. *Davey Compressor Co.*

For more data insert No. 19 on postcard, p. 37.

### Beam and Shape Punch

**Punches plates or webs of beams, channels and angles.**

This new guillotine punch is equipped with air operated clamps against adjustable fixed stops, and gag operating levers for operation of machine from the right side. Punch tools are gagged for selec-



tive punching. Specifications are: Capacity, 200 tons or four 15/16 in. diam holes through 3/4-in. plate; stroke, 2 1/2 in.; distance between housings, 32 in.; ram, right to left, 28 in., front to back, 13 in.; die space, 26 in. *Beatty Machine & Mfg. Co.*

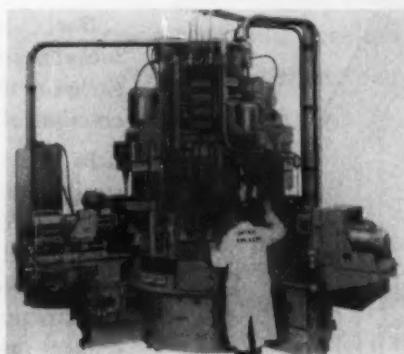
For more data insert No. 20 on postcard, p. 37.

### Special-Purpose Machine

**Processes converter housings for automatic transmissions.**

Cast iron converter housings for automatic transmissions can be processed at the rate of 114 parts per hr at 100 pct efficiency on the six-station center column, automatic cycle machine. The machine drills, chamfers, reams, counterbores, or taps a total of 51 holes. It

is automatically indexed throughout the 31 1/2-sec work cycle, the indexing mechanism driven by a hydraulic fluid motor that permits variable acceleration and deceleration rate. The 4-in. counterboring tool is carbide tipped; other tools are high speed steel. Tool speeds for drilling and chamfering are 80 fpm, reaming 45 fpm, counterbor-



ing 250 fpm, and tapping 20 fpm. Feed rate is 6 ipm. Multiple spindle heads are driven by 12 motors ranging from 1 to 7 1/2 hp, 1800 rpm. The machine is interlocked electrically and can be operated by unskilled workmen. *Snyder Tool & Engineering Co.*

For more data insert No. 21 on postcard, p. 37.

### Cast Iron Frame Motors

**Suitable for applications where corrosion is a problem.**

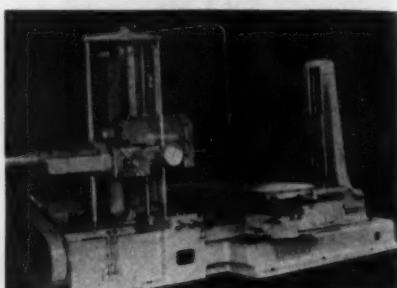
Cast iron frame totally enclosed fan-cooled motors are available in ratings from 5 to 250 hp in both standard (EP) and explosion-proof (JP) designs. The blowers used on EP motors are malleable iron, and those on type JP motors are non-sparking bronze. On all except the largest ratings, the blower design permits operation of the motors in either direction of rotation. The stator laminations are isolated from the air stream by the cast iron inner frame which completely surrounds them. The rotor squirrel cage is cast aluminum. Each rotor is dynamically balanced to insure freedom from vibration. *Wagner Electric Corp.*

For more data insert No. 22 on postcard, p. 37.

### Horizontal Boring Machine

**Modernized changes in design.**

The bed of the three and four spindle series of horizontal boring, drilling and milling machines has been extended to support the motor, and speed and feed gear boxes. Control handles have been reduced in size and number, and



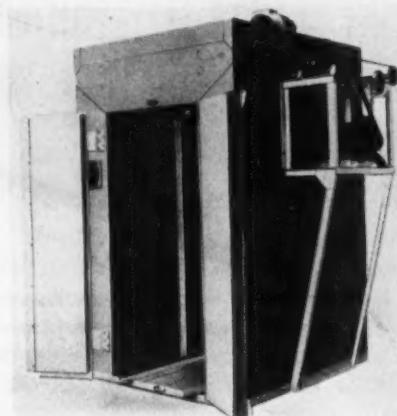
are color coded. Feed unit selecting levers indicate direction of feed and feeds can be combined. One of the main features of the Lucas machine is an automatic power position control that allows an operator to set up and run through a complete production job by inserting master rods and then through regular operating controls, get exact settings without hand adjustment, for each subsequent operation. *Lucas Machine Div., New Britain Machine Co.*

For more data insert No. 23 on postcard, p. 37.

### Batch Ovens

**Bench, cabinet, truck types for process heating to 500°F.**

The bench and cabinet types are available with gas or electric heating and the truck oven has six types of heating systems: direct or indi-



rect gas, direct or indirect oil; electric or steam. *Gehnrich* standard ovens are constructed of heavy gage aluminized steel panels in-

*Turn to Page 126*

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1. p. 37.

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Sounds like an exaggeration, doesn't it? But it's not so far-fetched when you consider that this machine screw symbolizes a whole group of fastenings that have been failing in service because of corrosion.

More or less, this happens every day in American industry. A small bolt or screw or rivet, that was never designed for use under corrosive conditions, gives way—and the whole machine, or process, grinds to a stop.

The only way to keep out of this picture is to make sure that the fastenings you use are non-ferrous or stainless steel.

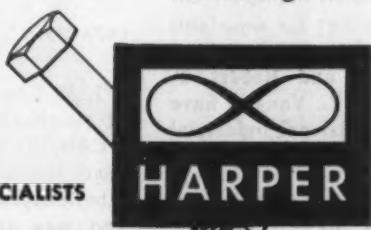
Harper specializes in these Everlasting Fastenings; makes them in over 7000 different sizes, types and alloys—Brass, Bronzes, Copper, Monel and Stainless Steels; maintains large quantities in stock, ready for immediate delivery from distributors and warehouses located in principal cities.

If rust and corrosion resistance is important to you . . . if you can see the real economy in replacing common steel with fastenings that are non-magnetic, longer-lasting, reusable . . . write today for our catalog and current stock list: The H. M. Harper Company, 8215 Lehigh Avenue, Morton Grove, Ill.



## BOARD of DIRECTORS *meeting on* **a machine screw**

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Philadelphia, Pittsburgh, St. Louis, Seattle, Toronto (Canada)

IN NON-FERROUS AND STAINLESS STEEL FASTENINGS

# Iron Age *Introduces*



O. B. STAUFFER was appointed manager, advertising division, American Steel & Wire Co.



F. RAY FRIEDLEY was elected a director and comptroller of Geneva Steel Co. and Columbia Iron Mining Co.



GEORGE CARLETON, JR., has been elected president of Nice Ball Bearing Co., Philadelphia.

C. S. Davis, Jr., was appointed to the presidency of the Norge Heat Div., with central offices in Detroit, of the BORG-WARNER CORP. Mr. Davis formerly was vice-president and general manager of Norge Heat.

Ralph L. Beach was promoted to assistant general service manager of YORK CORP., York, Pa.

Charles Schramm is retiring as manager of sales for FORT DUQUESNE STEEL CO., Pittsburgh, after 48 years of service to the steel industry. Prior to joining the Fort Duquesne organization in 1945, Mr. Schramm was manager of sales, secondary products division, CARNEGIE-ILLINOIS STEEL CORP., Pittsburgh.

Robert C. Webster has been made sales manager of ARTISAN METAL WORKS CO., Cleveland. Arthur A. Hasenpflug was named plant manager and Henry P. Gottschall becomes controller of the company.

Nicholas Kelley, Jr., has been named secretary of CHRYSLER CORP., succeeding R. P. Fohey who has taken an extended leave of absence for health reasons.

John L. Kimberley has been named sales manager, continuous-cast products, and will direct the new program from the Perth Amboy plant of the AMERICAN SMELTING & REFINING CO. Ralph W. Bailey and John V. Hackett have been appointed assistant sales managers. Donald S. Goebel has recently joined the company and will make his headquarters at the Whiting, Ind., plant.

Ralph T. Rycroft, vice-president of KENCROFT MALLEABLE CO., INC., Buffalo, was elected president of the MALLEABLE FOUNDERS' SOCIETY.

James P. Williams, who has been chief industrial engineer for KAISER STEEL CORP. at Fontana, Calif., has been appointed division manager, engineering and planning; his assistant, Bruce Clafin, has been named chief industrial engineer; and Robert T. Richmond and Ralph L. Vaughn have been promoted to divisional industrial engineers.

Donald L. Deland has been appointed export sales manager of MICHIGAN ABRASIVE CO.

L. B. Bellamy, district manager, STERLING GRINDING WHEEL CO., Detroit, has been named chairman of the National Standards Committee of the AMERICAN SOCIETY OF TOOL ENGINEERS, Detroit.

R. G. Muir has been appointed vice-president in charge of sales of FABRI STEEL PRODUCTS, INC., Detroit.

F. B. Newcomb and J. F. Matteson were appointed assistant managers of sales for AMERICAN CAN CO., central and pacific division, respectively. Mr. Newcomb was formerly Chicago district sales manager while Mr. Matteson served as sales division manager in the pacific division.

E. E. Howe has rejoined CHICAGO VITREOUS ENAMEL PRODUCT CO. in a special staff assignment capacity.

J. F. Lingeman was made manager of purchases and production for the DEARBORN CHEMICAL CO., Chicago. Mr. Lingeman joined Dearborn's laboratory staff in 1925 as a chemist and was appointed assistant to the vice-president in February of this year.

Parker Frisselle has been named manager of market research for DOW CHEMICAL CO., Midland, Mich.

E. T. Warren has been elected president of TATA INC., New York. Mr. Warren has held the position of vice-president of this corporation since his return from India in 1949.

Albert S. Cheyne has been appointed district manager of the new Kansas City office of PRESSED STEEL TANK CO., Milwaukee. He will cover the states of Nebraska, Kansas, Oklahoma, Arkansas, Missouri (excluding St. Louis county) and western Iowa.

David N. Noye has been appointed resident industrial relations director of FISHER BODY Plant No. 2, Flint. He replaces Robert B. Squires, who has been moved to the division's general offices in Detroit as senior staff assistant in labor relations.

James C. Smith, Jr., was elected president of JAMES CAMPBELL SMITH, INC., to fill the vacancy left by the death of his father, while John H. Smith was elected vice-president and general manager.

John C. Holley was promoted to vice-president in charge of sales and E. V. Moore was made vice-president in charge of finance for the HOLLEY CARBURETOR CO., Detroit.

John T. Wiseman, general manager of the Boston district, BETHLEHEM STEEL CO., was elected president of ASSOCIATED INDUSTRIES OF MASSACHUSETTS. He succeeds the late C. Lawrence Muench, president of HOOD RUBBER CO.

Henry E. Heilman was named vice-president of sales, INTERNATIONAL B. F. GOODRICH CO.



GEORGE T. KEARNS, treasurer of Kennemetal Inc., has been made a director of the company.

## Iron Age Salutes

W. W. SEBALD

EVERYBODY knows it is a tough job these days for management to get its story across. If the number of speeches on free enterprise were laid end on end they would reach pretty far.

Men giving such talks are sincere. They believe what they say; and most of them practice what they preach.

Once in a while though, you run up against a man in a talk that literally demands outstanding attention.

Newspapers today often look for the sensational. Things that are homey, simple and clear-cut don't always get the attention they deserve.

A short while ago a wiry steel man stood before a group of mining and metallurgical engineers. He was slated to give a serious talk. Before him on the program had been a speaker who kept the audience in stitches with his funny remarks.

The steel man, W. W. Sebald, president of Armcro Steel Corp., had a tough job. He thought he had a serious subject to talk about. Because he talks like he thinks and acts, he held his audience spellbound.

Now what was it in this talk "Pocketbook Economics" that makes it outstanding? The answer is simple. There were not many brickbats and there were not too many bouquets. The story of inflation was told in terms that anybody could understand.

Governmental people and the Administration were criticized—so were businessmen. Many things Mr. Sebald said have been said before but his low pressure attitude and simple approach drove home



the danger in the present economic picture.

This is no place to repeat the talk. You can get a copy of it from Mr. Sebald by writing to him at Armcro Steel Corp., Middletown, Ohio. It will be worth your while to read it.

We salute Mr. Sebald because he has high ideals in business, in public relations, in foremen training and in employee relations. He practices what he preaches every day in the year. His office door is literally open to anyone who has a gripe or an idea.

He believes in a certain amount of dignity but not too much; he is just as apt to appear on the openhearth floor as he is to show up at any of his company's numerous subsidiaries—unannounced.

His slogan is "A company reflects the character and actions of the men who head it up." What employees see in a company they must get from supervisory and executive personnel.



JOHN E. MCGRATH becomes manager, market development division, American Steel & Wire Co.



D. L. EDELMUTH was made vice-president and general sales manager, Whiting Appliance Co., a division of Baltimore Porcelain Steel Corp.



GEORGE G. SCHUSTER becomes a member of the board of directors, Kennametal Inc.

C. Ashley Woodhall has been made purchasing agent of WALTER KIDDE & CO., INC., to succeed N. Vuyosevich, who has resigned.

D. E. Clifton has been appointed director of the marketing personnel division of BURROUGHS ADDING MACHINE CO.

W. J. Laird is the new superintendent of equipment, feeder division, WESTINGHOUSE ELECTRIC CORP.

N. A. Carter, Sr., has been elected a vice-president of the FRUEHAUF TRAILER CO., Detroit. He will continue as general manager of the Fruehauf-Carter Div.

New assistant service managers of FORD MOTOR CO.'S Ford Div. are Fred J. Schaefer, technical services; S. J. Rogers, product information and J. B. Nicolls, training and merchandising.

Capt. Howard Thomas Orville is retiring voluntarily after 29 years service as a Navy aerologist to become director of engineering for the Friez Instrument Div. of BENDIX AVIATION CORP.

J. Calvin Brown, of Los Angeles, owner of the firm bearing his name, has been nominated as the 1951 president of the AMERICAN SOCIETY OF MECHANICAL ENGINEERS.

Walter Z. Davis has been appointed chief engineer of BROWN TRAILERS, INC., Spokane. Before joining the company in 1946, Mr. Davis was assistant to the mechanical superintendent of the KAISER ALUMINUM & CHEMICAL CORP. reduction plant at Mead, Wash.

J. G. Leach was appointed to the newly-established position of division industrial engineer, WESTINGHOUSE ELECTRIC CORP.

Don C. Stablein has been appointed general sales manager of the K. O. LEE CO., Aberdeen, S. Dak. He succeeds Don T. Lyons, who recently resigned to take over duties as general sales manager of the BISHMAN MFG. CO., Osseo, Minn.

Jess Toth, director and secretary of the HARRY W. DIERTERT CO., Detroit, is the newly elected chairman of the Detroit chapter of the AMERICAN FOUNDRYMEN'S SOCIETY.

Emil P. Knapp, formerly assistant chief engineer of the SQUARE D CO.'S Kossman Instrument Div., has been appointed chief product engineer of the organization.

Orville B. Tearney, assistant manager of credits and assistant manager of the insurance division of INLAND STEEL CO., has been elected to the board of directors of the CHICAGO ASSOCIATION OF CREDIT MEN.



EDWARD S. WALTZ is the new Detroit branch manager for Wheelock, Lovejoy & Co., Inc.



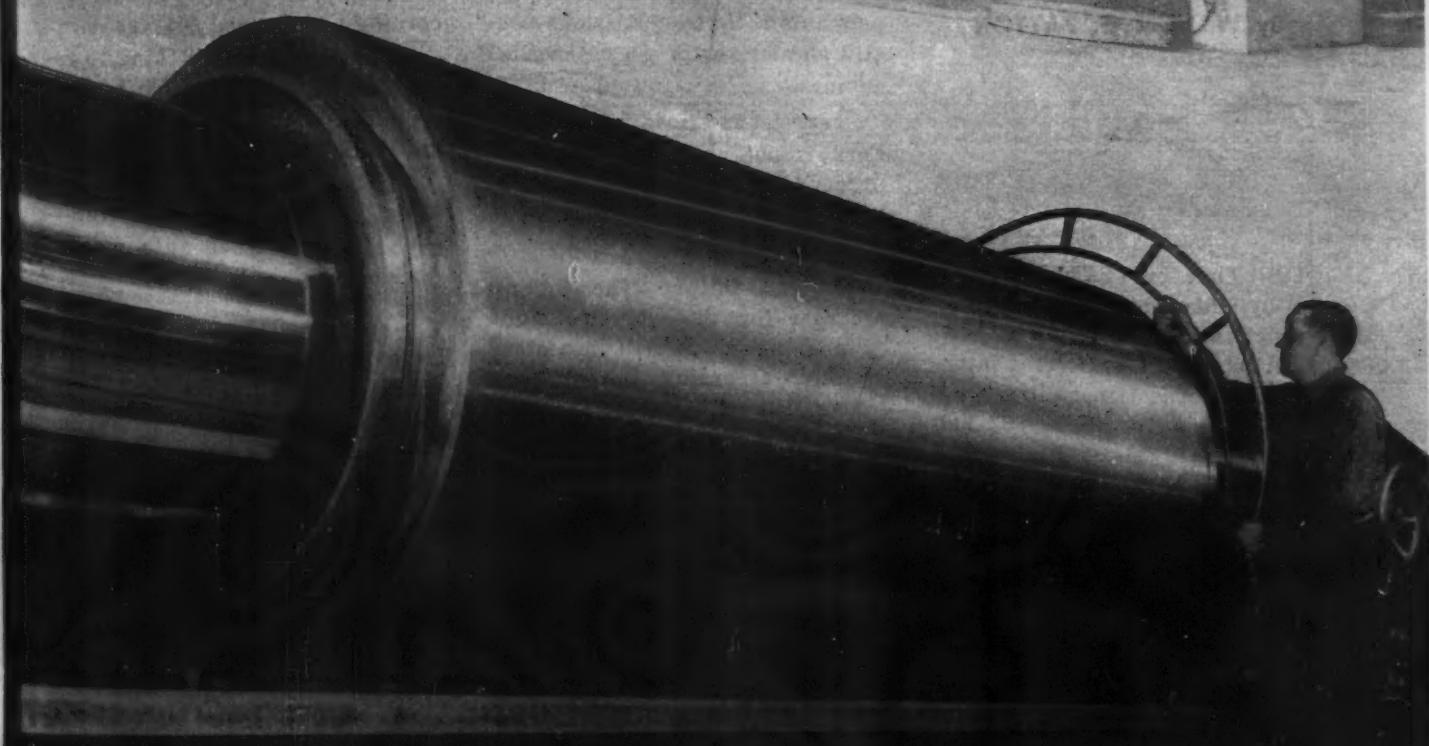
W. T. CUSHING, JR., takes over as manager, drilling equipment sales, for the National Supply Co.



ALLEN P. BECKLOFF is the new manager, tubular products division, Joseph T. Ryerson & Son, Inc.

# MESTA

## BACKING-UP ROLLS FOR FOUR-HIGH HOT AND COLD MILLS



DESIGNERS AND MAKERS OF COMPLETE STEEL PLANTS

**MESTA MACHINE COMPANY**

PITTSBURGH, PENNSYLVANIA

Mesta 59" x 130" Heat Treated Special Alloy Steel Backing-Up Roll Being Finished in a 60" Mesta Heavy Duty Roll grinder.

# On the ASSEMBLY LINE

## AUTOMOTIVE NEWS AND OPINIONS

**Olds discontinues its "76" . . . Tooling programs slow down . . . Reuther tells why he signed 5-year pact with GM . . . Studebaker grants minimum pension of \$100 per month.**



By WALTER G. PATTON

**Full Time on "88"—**The decision by Oldsmobile to discontinue production of its six cylinder "76" model is subject to several interpretations, the most likely of which is that the Olds "88" has caught on so successfully that Olds has all it can do to meet the demand for cars powered by its new Rocket engines.

Olds intends to take up the slack caused by dropping the "76" with added capacity at its Lansing Rocket engine plant.

The conclusion that Olds may be out of the six cylinder market is not warranted, according to trade sources. For several years, Olds has been working on a new six cylinder engine, including a

V-6. It seems likely that when the market is right a six cylinder engine will be introduced. Right now the best bet seems to be an in-line six rather than a V-6.

**Exceptions to Rule**—In part, it may be a trend but it is often a necessity to boost power with an automatic transmission. There are few exceptions to the rule that the new automatic transmissions usually go along with more powerful engines.

Chevrolet is the latest example. Ford is not changing its engine proper but some changes have been made in the crankshaft, it is reported.

**Chrysler Output**—The tooling program for the Chrysler eight cylinder engine is still in a state of flux, according to informed sources. The decision to boost output of the new engines from 20 per hr to at least 40 now appears to be definite.

Whereas it was reported earlier that only Chrysler and De Soto were interested in the new engine program, it is presently indicated that Dodge and Plymouth may also participate. Some important decisions are anticipated in the near future.

**Ford Program Slows**—The Ford engine program is also going through some important gyrations,

according to the trade. The Ford six which is definitely set for Cleveland is making some progress but activities involving new engines for the Mercury, Ford and Lincoln seem, for the moment, to be marking time. Some equipment is being ordered for the present Mercury engine but the entire Ford program has slowed down noticeably in recent weeks, according to informed sources.

The most important thing to remember about automotive tooling programs is that progress is usually made inversely as compared to sales volume and war scares. Right now sales are booming—nobody sees a poor auto market for months ahead.

**UAW Apologia**—In the current issue of "Ammunition," UAW-CIO official publication, Walter Reuther explains why the union accepted a 5-year contract with GM in preference to a shorter agreement which would undoubtedly escape much of the criticism leveled at the present contract.

Reuther says the union was faced with the decision of working to achieve a 2-year agreement based upon the 1949 10¢ economic pattern or traveling the road of a 5-year agreement in which the worker would get a 19¢ economic gain effective immediately, plus an

additional 16¢ improvement in the wage structure during the life of the agreement.

**Benefits Listed** — The 5-year agreement, Reuther said, also made it possible to achieve immediate gains in pension payments, hospital-medical insurance benefits, third week vacation pay for more than 64,000 workers this year, improved seniority provisions, union security and many other gains that were not available in a short 2-year agreement.

**New Powerglide Goal** — There are few better examples of the significance of production tooling than the new Chevrolet automatic transmission. Incidentally, Chevrolet has now produced more than 100,000 of these units.

Entering 1950 Chevrolet was turning out a few hundred transmissions a day. Last week the company announced its output was at the rate of 1300 units a day. Equipment is being installed that will boost output to 2000 units per day. This goal will be reached before the end of the year.

**In Back of Demand** — The man who sits at the sales manager's desk in the various auto plants sees the following factors contributing importantly to the record-breaking demand for automobiles:

1. Unsatisfied demand resulting from shortages during the war.
2. Large replacements of post-war cars.
3. 11 million cars in operation over ten years old.
4. A 20 pct increase in U. S. population since the mid-thirties.
5. Number of people able to buy new cars has jumped 35 pct from prewar.
6. The movement of urban population into suburban areas is expanding the need for transportation.
7. War-scared buyers.

**Handling Minimized** — To those who have not seen it before, the

tooling of modern automobile plants is often nothing short of spectacular. Handling of the product is eliminated at every opportunity. Parts move from one station to another in a single machine or are transferred by cleverly designed mechanisms from one machine to another. The automatic transmission is probably the best example.

One company, for example, has installed an automatic transfer machine which performs 32 separate operations on a transmission case. A similar machine completes 22 automatic operations on the transmission bell housing. The only hand operations are loading and unloading. In this particular company approximately 10 pct of the company's employees are now engaged solely in the production of automatic transmissions.

**Better and Better** — The UAW-CIO appears to be trading a constantly improved wage pattern for long-term contracts. In the case

of GM (see above), the union got a substantial improvement over the earlier Ford pension pattern. Another wage gain is reflected in the terms of the agreement with Briggs concluded last week.

Under the new Briggs contract, the union gets a flat 5¢ hourly wage boost plus pensions and other benefits. Union sources claim the Briggs wage package totals 13 to 15¢ per hr and that it is at least 5¢ an hr better than the Chrysler agreement. The contract may be reopened annually for wages.

**Pensions Stay Same** — Another labor trend evident here is elimination of the reduction in pensions which was first incorporated in the Ford agreement. In the recent Studebaker agreement, for example, Studebaker grants a minimum pension of \$100 a month, including Social Security. The pension is non-contributory and has a non-initial reopenable period of 5 years.

### THE BULL OF THE WOODS

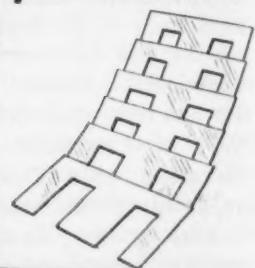
By J. R. Williams



# 250,000 Laminations Per Day!



550 parts  
per minute—  
almost 10  
per second!



WINDOW-SHADE FERRULES Blanked,  
Formed and Pierced at rate of more than  
4 per second!

Another typical multi-  
stage operation  
performed at high  
speed on the Multipress  
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feed accessory.

ACCURATE CORRUGATIONS FORMED in  
metal strip at speed of 25 ft. per minute

Another case where the  
controlled accuracy of  
Multipress with the  
harmonic stock feed  
combines top-speed  
production with  
close precision.



\*REG. U. S. PAT. OFF.

*Four times faster than the ticking of your watch, this Multipress turns out motor laminates, accurately punched and sheared in a three-stage operation. To keep pace with the rapid-fire action of the Multipress ram, continuous metal strip is fed automatically to the press tooling by Denison's Harmonic Stock Feed, a Multipress accessory. Feed and press are interlocked in complete harmonic motion. Quality of work is consistent, scrap is held to a minimum, press operation is safer and easier. Harmonic action of the rotary drive produces smooth acceleration and deceleration of material advancement, with an accuracy of plus or minus .002".*

The fully adjustable Multipress ram action is set for a quarter-inch stroke and 1½-ton maximum pressure on this operation. This assures less wear on tooling and equipment, absence of "overlength strokes," more accurate control, safer operation, less chance for damaging parts. Smooth, hydraulic action also reduces die wear, avoids damage from pile-up of parts, and cuts maintenance costs.

A wide range of high-production jobs can be handled faster, better, safer, and at much lower cost on the amazingly compact Multipress, available in capacities of 1 to 35 tons, with tooling and accessories for almost any need. Write for complete details!



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1158 Dublin Road Columbus 16, Ohio

# WEST COAST PROGRESS REPORT

Digest of Far West Industrial Activity—By R. T. REINHARDT



**"California, Here I Come"**—Reports on the continuing "growth of the West" detailing industrial expansions and developments and influx of people are issued with monotonous regularity, but facts are facts.

Reliable estimates indicate that about 12,000 to 15,000 persons move into California each month and that about 8000 of these head for the Los Angeles area alone. Impact of this migration is terrific.

**They Need Houses**—Most apparent effect is in residential construction. In May enough permits for dwellings to house more than 30,000 persons were issued in the Los Angeles area and total permits represented an investment of \$106,358,115. That figure was about \$500,000 below the record of March and for the second time this year exceeded the previous high set in August, 1948.

Residential permits issued for the first 5 months of this year total \$289,288,024.

**Ditto for Frisco**—In San Francisco, May building permits totaled \$2,557,517 covering 318 dwellings and the total for the past 5 months was \$15,424,422.

It should be pointed out that the Los Angeles figures are derived from the entire county which includes 45 cities and a large unincorporated area whereas the San Francisco figures cover only the peninsular city and county of that name.

**How Steel is Affected**—This continuing building boom has created a tight market for every steel and iron product going into homes. Plumbing pipe—both galvanized steel and cast iron—are getting hard to come by.

Kaiser Steel Corp., the only producer of galvanized plumbing pipe on the Coast, is booked solid through the third quarter on this commodity and there is little doubt but that when last quarter books are opened they will be quickly filled.

Incidentally, Kaiser's price on galvanized pipe went up on June 26 about \$6 per ton when the discount dropped three points. This increase was in advance of a similar raise by other producers based on increased zinc costs.

**Revived Interest**—Cast iron soil pipe producers in the Los Angeles area are working at capacity after a dull month or two earlier this year with no let-up in sight. This activity has been responsible in large measure for the strength of the cast iron scrap market and the ready acceptance of imported pig iron by foundries.

Although nails are moderately tight, nothing like a black market has developed and importers report that business in this commodity hasn't been too good.

**Bathtub Plant**—Plumbing fixtures are not too abundant and suppliers are having difficulty in keeping up with demand. Allianceware, Inc., of Alliance, Ohio, has announced plans to build a plant

at Colton, Calif., to produce steel bathtubs starting about December to serve the western market.

**Calstrip Expands**—The first cold rolled strip steel mill in the West is now engaged in its fourth major expansion. California Cold Roll Steel Corp., Los Angeles, has just completed installation of its fourth annealing furnace with controlled atmosphere increasing this facility by 40 pct.

The company has purchased an additional 3½ acres adjoining its present property and plans are being drawn for an addition to the office building.

**Beall Pipe to Move**—Purchase of a 10-acre site at the war-time Oregon Shipyard in Portland, Ore., will give Beall Pipe and Tank Co. new and enlarged facilities for the fabrication of pipe and other metal products. The recently acquired property includes 145,000 sq ft under roof and five large enclosed bays.

**New Filtrol Plant**—Filtrol Corp., manufacturer of catalytic agents for the oil refining industry, has taken a long-term lease on a 30-acre site in Salt Lake City on which it will construct a \$2.5 million plant.

Filtrol, which operates plants in Los Angeles and Jackson, Miss., will get its clay for the Utah plant from Eureka, a non-ferrous metal mining district which has been hard hit by mine shutdowns in recent years.

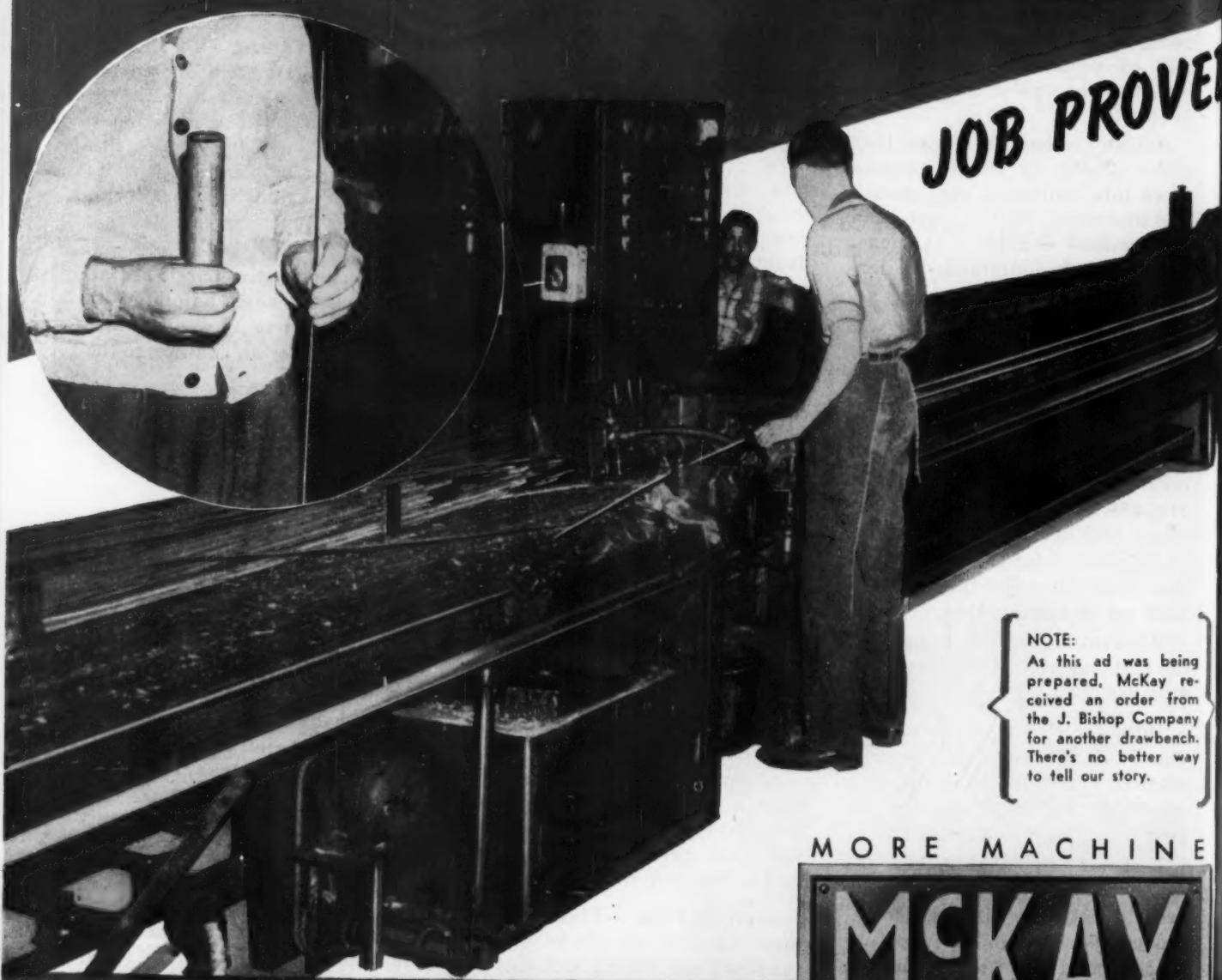
# HERE'S A HYPODERMIC NEEDLE STORY THAT COULD GIVE YOUR BUSINESS "A Shot in the Arm"

**MCKAY DRAWBENCH STRETCHES 1 1/2" STAINLESS  
TUBING INTO NEEDLES AT J. BISHOP COMPANY**

Hypodermic needles—with an outside diameter as small as .008"—actually start out as 1 1/2" diameter stainless steel tube. This tube is then drawn through progressively smaller dies until reduced to the size required. This redrawing of stainless steel tube is a specialty of the J. Bishop & Company Platinum Works of Meadville, Pennsylvania. They rely on the multiple-die McKay Drawbench for high-speed precision work of all kinds.

The variable voltage D. C. drive on the McKay Drawbench installed at this company permits production speeds limited only by the characteristics of the material being drawn. The carriage is returned to the die at a speed of 300 F.P.M. to keep non-productive time to an absolute minimum. Accurate controls are furnished for acceleration, deceleration and positive stopping.

Bishop Company officials say the ruggedly built McKay is the most efficient drawbench they operate; that it has delivered top-flight performance since installation.



**NOTE:**  
As this ad was being prepared, McKay received an order from the J. Bishop Company for another drawbench. There's no better way to tell our story.

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*The* **MCKAY MACHINE Company**  
ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT  
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ASSOCIATED COMPANY The WEAN ENGINEERING CO., Inc. • WARREN, OHIO



# THE FEDERAL VIEW

THIS WEEK IN WASHINGTON



By EUGENE J. HARDY

**More Government** — Regardless of the eventual outcome of American involvement in Korea, business will be affected in many ways. Already Congress has passed a strong draft extension, including provisions to allocate steel and seize plants. More money for defense will be spent this year, both for U. S. forces and foreign aid.

Even if additional funds are not appropriated, existing appropriations will be spent faster. Comprehensive manpower, control and allocations legislation is ready at the National Security Resources Board.

**Stockpile Review** — Large-scale equipment orders can be activated immediately if the need arises. Stockpile objectives are being reviewed by the Munitions Board.

There will be renewed pressure for steel expansion, government aid for taconite beneficiation, and subsidies for domestic mining. Tax cuts may go down the drain. Inflationary pressures will mount and higher wages and prices are in prospect.

**Aid for Ore** — The need for taconite development is being used by Administration spokesmen as a possible spur to get Congressional action on the Truman small business loan program.

Bureau of Mines Director James A. Boyd, has told a Congressional committee that while firms engaged in taconite research and development could not qualify as small business under the Administration bill they could qualify under the defense provisions.

**Loan Authority** — These provisions give the President broad authority to approve loans for purposes "essential to national defense." Mr. Boyd also said that the bill should help to overcome "some

of the current inertia that has resulted in virtual stagnation of an important segment of our metal mining industry."

This reference was pointed to the non-ferrous mining industry which has been appealing for government aid since the end of World War II.

**Steel Politics** — The report on the steel monopoly investigation of the House Judiciary subcommittee will not be completed until after the Congressional elections in November.

If any further proof of political motives surrounding probes of the steel industry is needed, this is it. It is sheer nonsense for committee staff members to say that they "cannot have a report ready before late November or December." The public hearings were concluded in May (THE IRON AGE, May 11, p. 60).

**Balm for Business** — The real reason for delay would appear to be a desire not to frighten business and investors until after the elections. Then, too, chairman Celler, D. N. Y., didn't do too well with his fishing expedition, primarily because U. S. Steel and other firms took the offensive—a decided departure from previous appearances on Capitol Hill.

This could mean that Mr. Celler will have some difficulty in convincing other committee members that the report should go along with his original pre-judging of the monopoly aspects of steel.

**Labor Shortage?** — The sharp upward jump in unemployment to around 5,000,000 — feared earlier by government officials — had not yet occurred by mid-June. It may not come off at all this year.

One reason is the unexpected turn in the international situation which could quickly force an upward revision in defense expenditures and industrial contracts. In this event, instead of surplus labor there could be shortages, especially in skilled lines such as in the aircraft industries, postwar's most sharply reduced work force.

**Steel, Detroit Helped** — Disregarding this factor, a steady climb in employment has added more than 1.5 million to the nation's pay rolls since February.

At the end of May, the total employment figure was nearly a half-million more than the previous May and unemployment had been reduced to around 3,000,000. The favorable turn has been conceded by the Labor Dept. to be largely due to high output rates in the steel and automotive industries.

**Ore Shipping** — Canadian vessels will be able to transport iron ore between U. S. ports on the Great Lakes until the end of this year. The law authorizing such shipments in Canadian ships was slated to expire on June 30.

The extension act gives the President the right to suspend this authority at an earlier date, a provision not likely to be used.



## Save 3 Ways With RYERSON STAINLESS STEEL

You save three ways when you use Ryerson service on stainless steel.

- 1** You save **inventory expense** because Ryerson maintains large stainless stocks that you can consider your own inventory reserve.
- 2** You save **time** because these stocks are available at thirteen plants, strategically located from coast to coast, and Ryerson ships promptly.
- 3** You can often reduce **operating costs** because the time-tested quality of Allegheny stainless from Ryerson stocks meets the most exacting requirements—thus avoiding production failures and assuring long years of service.

It's safe to keep your own stainless inventory at a practical working level because convenient Ryerson stocks

include most all types and finishes in practically every shape and size.

Allegheny stainless bars, angles, plates, sheets, tubing, pipe and fittings are all on hand for quick shipment. And since Ryerson also carries large stocks of carbon and alloy steel, you can save time and reduce paper work by concentrating your steel purchases with one convenient source. So get in touch with our nearest plant for every kind of steel.

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**STRUCTURALS**—Channels, angles, beams, etc.

**TUBING**—Seamless & welded mechanical & boiler tubes

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# RYERSON STEEL

# A Metallurgical Evaluation Of SAE Tool Steels



SAE has evaluated standard tool steels on a metallurgical basis. The ratings are arbitrary but relative between or among types of steels. A selection of a particular analysis by physical properties in each and every group is now possible with the assurance that each standard grade has a specific relationship with any other.

By A. S. JAMESON, Supervisor,  
Metallurgical Research Laboratories, International Harvester Co., Chicago

THE evaluation of tool steels in terms of their physical properties is of great value to tool designers and users. Tool steels should be selected through knowledge of the physical characteristics which relate them to performance in service. In effect, this is the mechanism by which they are developed by their makers.

Historically, the first tool steels were the carbon steels. From them evolved the more highly alloyed steels. The alloys were added to produce special properties. An elaboration of these special properties is contained in the box.

All tool steel possesses to a certain degree these enumerated properties, but the special steels have one or another of these properties

developed to a remarkable degree. Unfortunately, all these properties cannot be developed to a high degree in any one steel because the possession of such properties are often mutually opposed to one another. For instance, resistance to abrasion is developed by adding relatively large quantities of carbide forming elements such as carbon, chromium and molybdenum at the expense of toughness or shock resisting properties.

In the accompanying chart<sup>1</sup> the SAE tool steels are evaluated on the basis of these special properties. The evaluation is arbitrary but relative. Each of the steels in the six types are rated in the five characteristics of major importance in such steels. In the box below

## SPECIAL PROPERTIES

1. Heat resistance as desired for hot work applications such as tools for forging punches and dies, hot shearing and metal molds for diecasting.
2. Abrasion resistance required for cold blanking and forming dies, cold shears, etc.
3. Shock resistance to breakage from repeated blows desired for pneumatic hammers and chisels.
4. Minimum distortion, the property of retaining size after hardening, desired in complicated dies which cannot be suitably ground to size after hardening.
5. Cutting ability required for metal cutting tools such as tool bits, broaches, drills, etc.

each merit rating chart will be found a short list of the important characteristics typical of each grade.

The chemical composition of these steels is

given in the accompanying table. The letters identify the steel in each group. The groupings are taken from the captions Water Hardening Tools, Oil Hardening Tool Steels, etc.

#### References

<sup>1</sup> Society of Automotive Engineers Handbook, 1949 edition, p. 351.

## A Metallurgical Evaluation Of SAE Tool Steels

SPECIAL PROPERTIES OF THESE STEELS BY TYPE ARE LISTED AT THE RIGHT

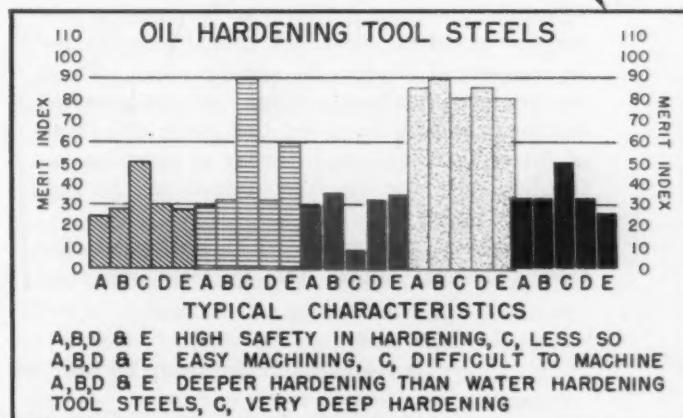
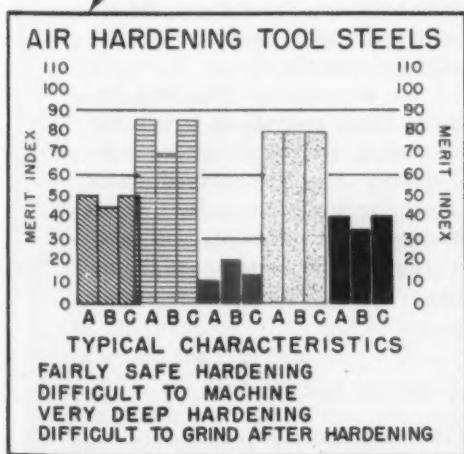
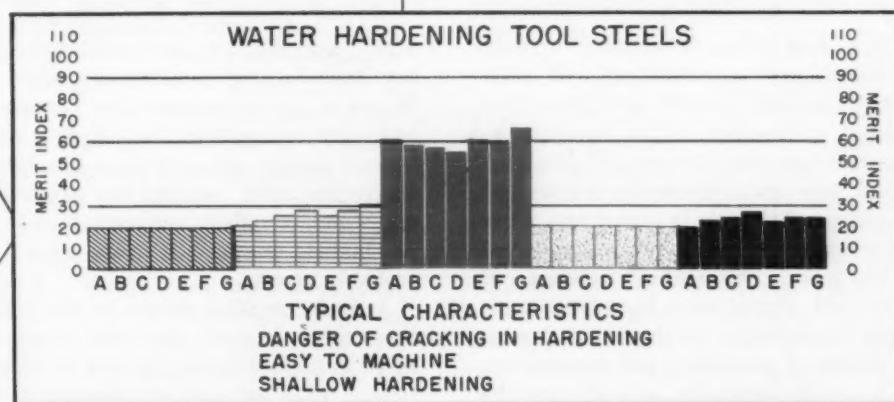
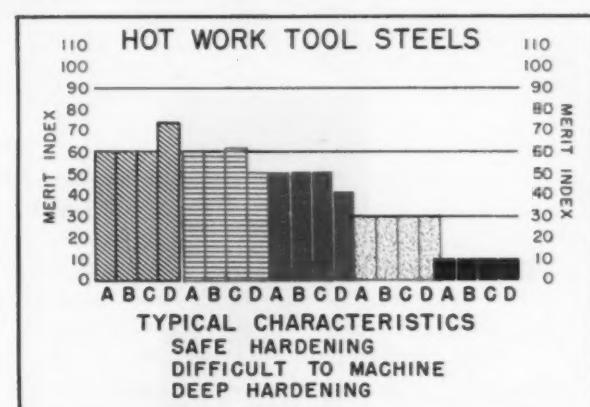
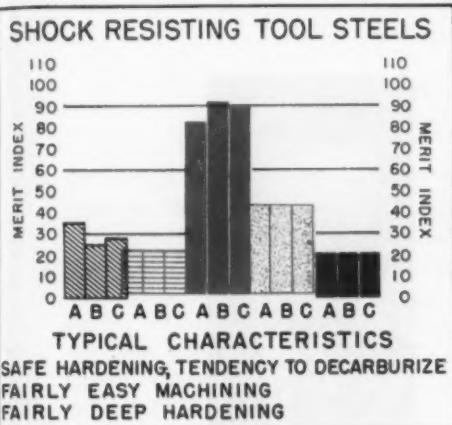
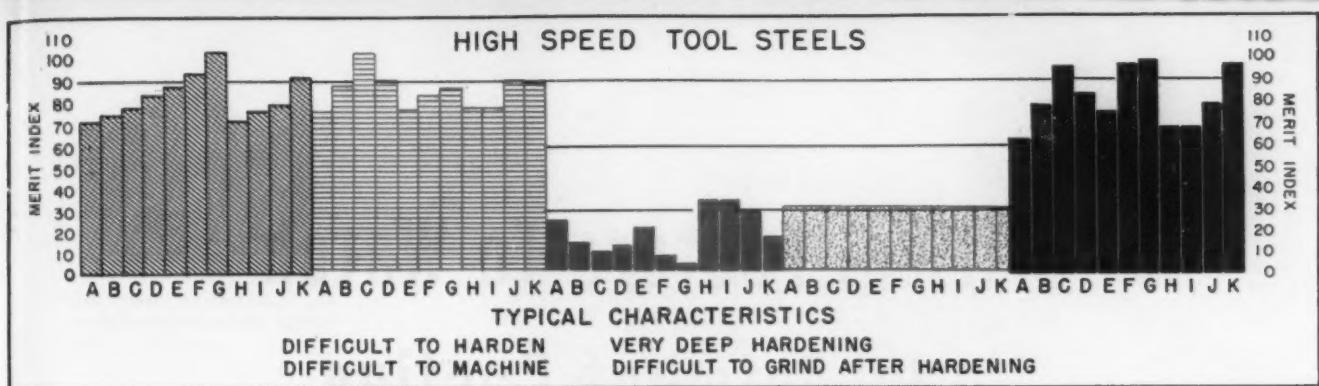
ANALYSES OF THE VARIOUS GRADES ARE SHOWN IN THE TABLE BELOW

#### Approximate Compositions of SAE Tool and Die Steels

	C	Mn	Si	Cr	V	W	Mo	Co	Ni
<b>WATER HARDENING TOOL STEELS*</b>									
a. Carbon.....	0.70-0.85								
b. Carbon.....	0.85-0.95								
c. Carbon.....	0.95-1.10								
d. Carbon.....	1.10-1.30								
e. Carbon-Vanadium.....	0.85-0.95				0.15-0.35				
f. Carbon-Vanadium.....	0.95-1.10				0.15-0.35				
g. Carbon-Vanadium.....	0.90-1.05				0.35-0.50				
<b>OIL HARDENING TOOL STEELS</b>									
a. Low Manganese.....	0.90	1.20	0.25	0.50	0.20†	0.50			
b. High Manganese.....	0.90	1.60	0.25	0.35†	0.20†		0.30†		
c. High Carbon-High Chromium.....	2.15	0.35	0.35	12.00	0.80†	0.75†	0.80†		0.50†
d. Chromium.....	1.00	0.35	0.25	1.40			0.40		
e. Molybdenum Graphitic.....	1.50	0.30	0.85	0.20			0.30		
<b>AIR HARDENING TOOL STEELS</b>									
a. High Carbon-High Chromium.....	1.50	0.40	0.40	12.00	0.80†		0.90	0.60†	
b. 5 Pct Chromium Air Hard.....	1.00	0.60	0.25	5.25	0.40†		1.10		
c. High Carbon-High Chrome-Cobalt.....	1.50	0.40	0.40	12.00	0.80†		0.90	3.10	
<b>SHOCK RESISTING TOOL STEELS</b>									
a. Chromium-Tungsten.....	0.50	0.25	0.35	1.40	0.20	2.25	0.40†		
b. Silicon-Molybdenum.....	0.50	0.40	1.00		0.25†		0.50		
c. Silicon-Manganese.....	0.55	0.80	2.00	0.30†	0.25†		0.40†		
<b>HOT WORK TOOL STEELS</b>									
a. Chrome-Moly-Tungsten.....	0.35	0.30	1.00	5.00	0.25†	1.25	1.50		
b. Chrome-Molybdenum-V.....	0.35	0.30	1.00	5.00	0.40		1.50		
c. Chrome-Molybdenum-V.....	0.35	0.30	1.00	5.00	0.90		1.50		
d. Tungsten.....	0.32	0.30	0.20	3.25	0.40	9.00			
<b>HIGH SPEED TOOL STEELS</b>									
a. Tungsten, 18-4-1.....	0.70	0.30	0.30	4.10	1.10	18.00			
b. Tungsten, 18-4-2.....	0.80	0.30	0.30	4.10	2.25	18.50	0.80		
c. Tungsten, 18-4-3.....	1.05	0.30	0.30	4.10	3.25	18.50	0.70		
d. Cobalt-Tungsten, 14-4-2-5.....	0.80	0.30	0.30	4.10	2.00	14.00	0.80	5.00	
e. Cobalt-Tungsten, 18-4-1-5.....	0.75	0.30	0.30	4.10	1.00	18.00	0.80	5.00	
f. Cobalt-Tungsten, 18-4-2-8.....	0.80	0.30	0.30	4.10	1.75	18.50	0.80	8.00	
g. Cobalt-Tungsten, 18-4-2-12.....	0.80	0.30	0.30	4.10	1.75	20.00	0.80	12.00	
h. Molybdenum, 8-2-1.....	0.80	0.30	0.30	4.00	1.15		1.50	8.50	
i. Molybdenum-Tungsten, 6-6-2.....	0.83	0.30	0.30	4.10	1.90		6.25	5.00	
j. Molybdenum-Tungsten, 6-6-3.....	1.15	0.30	0.30	4.10	3.25		5.75	5.25	
k. Cobalt-Moly-Tungsten, 6-6-2-8.....	0.85	0.30	0.30	4.10	2.00		6.00	5.00	8.00

\* Carbon tool steels are normally supplied in four grades of quality which are Special, Extra, Standard and Automotive.

† Optional element; steels have found satisfactory application either with or without the element present.



HEAT RESISTANCE      CUTTING ABILITY

ABRASION RESISTANCE

MINIMUM DISTORTION      SHOCK RESISTANCE

# Critical Factors To Watch in Investment Casting



By R. L. WOOD, President  
Arwood Precision Casting Corp.,  
Brooklyn

and D. VON LUDWIG,  
Director of Research  
Vacuum Casting Corp.,  
Philadelphia



WITHIN a decade the investment casting process has become instrumental in solving material and design problems previously regarded impossible. The process has often been termed lost-wax process and precision casting, but is now most correctly designated investment casting. The title is important, since the precision phase of the industry has received unmerited emphasis. Exorbitant claims of numerous would-be investment founders, combined with the connotation of the word "precision" in the minds of engineers and toolmakers, have served to create confusion and obscure the real value of these casting techniques.

Inexperienced foundries often have done themselves and the trade a disservice by claiming production of tolerances which cannot be obtained in commercial practice by casting alone. These claims have confused design or procurement engineers to such an extent that many still think of investment castings in terms of precision coinciding with the results obtained on the best machine tools.

The actual tolerances which represent the trade's normal limits for properly designed

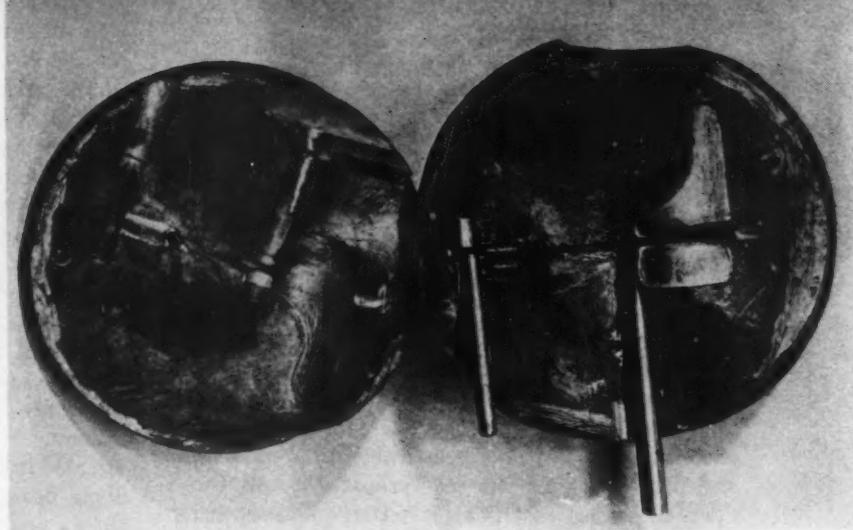
pieces are plus or minus 0.002 in. per in. for low temperature non-ferrous alloys and 0.005 in. per in. or part thereof for ferrous, refractory and high temperature non-ferrous alloys. Where special design consideration has been made, or where the need justifies the expense of special, non-standard effort, somewhat closer tolerances can be held on castings made from the most controllable metals.

A major conflict arises in the belief that the investment process can yield precise duplicates in all critical dimensions and in unlimited quantities. It is erroneously thought that when the sample castings happen to be within a lesser tolerance than that provided in original specifications, all parts subsequently produced will coincide exactly with the samples.

Acting on such an assumption, jigs and fixtures for secondary finish operations are often constructed, conforming to the practices normally used in finishing rough machined parts cut from solid stock by machine tools. These jigs often are useless for investment cast parts due to the fact that liquid metals are being formed, not solids. The full range of tolerance

Investment casting may be used for attaining accuracy of 0.002 to 0.005 in. Closer tolerances are possible in special cases. Precision castings are only precise within the limits of numerous factors which must be controlled. This is Part I of a two-part story.

**POORLY DESIGNED** soft metal die intended to produce aircraft door release latch. Improper selection of the parting line, attempt to make the release self-coring and poor workmanship prevented removal of the pattern without distortion.



permitted must be provided for in the fixtures, because the entire range will normally be encountered in a production run of castings. A curve of dimensional variation for a representative lot of 100 production pieces illustrates this point. It also serves to point out how adhering to close tolerances increases the piece price by necessitating 100 pct inspection of all parts and scrapping a large proportion of the production run.

Nothing has as profound effect on the shape and size of the desired casting as the master pattern or pattern die used to make the disposable patterns from which the part will ultimately be formed. In spite of this, the importance of the design, construction and finishing of masters and dies is often slighted in many plants. The precision with which the patterns of wax, plastic or any other material can be produced in quantity is governed by the accuracy with which the die is fabricated. The pattern and the casting cannot be smoother or more precise than the master pattern and die used to make them.

Master patterns are required when the die mold is to be made from a castable soft metal alloy. When a steel die is to be made, a perspective drawing of the die and the part to be cast, or a sample part usually will assist in correctly laying out the die to establish the most effective parting lines.

The master pattern must be exceedingly precise, and must allow for four shrinkage factors: (1) Shrinkage of the die alloy during solidification and cooling; (2) shrinkage of the wax or plastic pattern; (3) shrinkage of the investment during setting and firing; and (4) the solidification and cooling contraction of the metal in the casting. Design of masters is complicated by the fact that shrinkages in the patterns and of the castings are subject to considerable variation, even when the same pattern material and casting alloy are employed.

These variations reflect different design details in different castings such as the presence or

absence of cores, location of cored passages, ratio of core mass to metal, conjunction of heavy and light sections, location and design of angular projections, position and mass of gates, risers and vents, orientation of pattern in flask, position of casting in the flask relative to the point of admission of metal, method of forcing the metal into the mold, and other variations. It is therefore apparent that experience alone can govern the production of usable masters from which satisfactory dies, patterns and castings can result.

#### **Die Material Important**

Many metals have been used for investment pattern dies. Nearly all are now made from three general materials: (1) Steel; (2) zinc base alloys; or (3) soft alloys of lead, tin, bismuth, antimony, cerium and zinc. In special applications aluminum or brass dies are used. Most steel dies are made from free machining grades of low carbon steel. Guide pins, core bars, slides and other sections subject to abrasive wear are case hardened when the anticipated production quantity warrants it. Occasionally dies incorporating exceptionally fine detail requiring small fragile inserts are made from alloy tool steels. As a general rule steel dies are used for production quantities in excess of 25,000. For lesser quantities, design factors, required tolerances and other factors determine the choice of soft metal or steel dies.

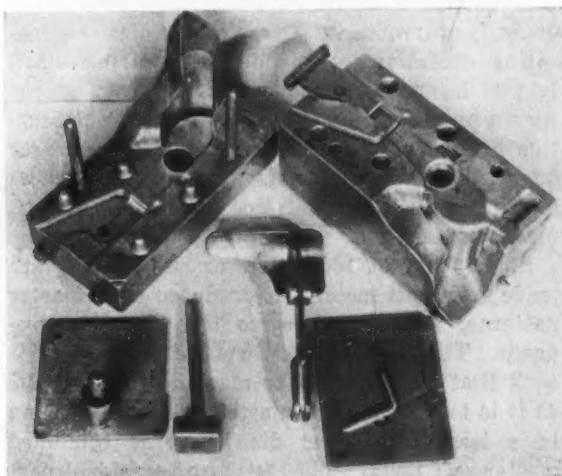
Short runs, of 1000 parts or less, usually are made from soft metal dies produced from master patterns, but exceptions to this rule are frequent. This is the case when the part design is such that it is as easy to machine the steel die as it is to machine the master pattern, resulting in a less costly steel die than the combined master-soft metal mold cost. An occasional part may involve so many inserts and such a complex parting line that a steel die is mandatory. Conversely there are instances where regardless of quantity, soft metal molds must be used to form

the patterns. Where mercury or low melting point metal alloys are the pattern materials to be formed, soft metal dies cannot be used.

Low melting alloys of the lead-tin-bismuth family include four with the trade designation Cerro of which Cerro-tru is most widely used. This alloy has no measurable solidification shrinkage. It can therefore be used for any part which can be incorporated in a soft metal die. This alloy is capable of reproducing the closest tolerance and the finest detail from a master pattern. There are no measurable differences in any plane between the master pattern and the Cerro-true dies cast from it. Dies of Cerro-tru reproduce cavities to less than 0.00025 in. deviation from the master pattern. Where multiple cavities are made from a single master, it is impossible to detect from which cavity a pattern has been made.

Kirksite has a solidification shrinkage of considerable magnitude. While it may be calculated and provided for in making the master, it precludes the use of Kirksite for thin sectioned, weak masters or for parts incorporating projections, parallel walls or angular sections of low thickness to length ratio. This results from the stresses encountered when Kirksite solidifies, which is often sufficient to distort or fracture the master pattern. It requires the provision of draft in many parts, limiting the degree of accuracy obtainable if the drafted dimensions are desired to close tolerance. For bulky pieces which permit strong masters, and for production of large numbers of patterns of such pieces, Kirksite is a desirable material. Within the inherent limits of applicability, a correctly designed and finished Kirksite die can be practically as accurate as a well made steel die.

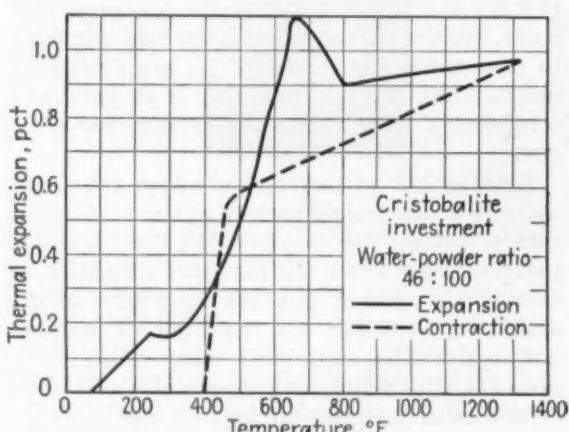
Engineering the die involves more than selec-



PROPERLY DESIGNED soft metal die for the aircraft door latch release, embodying a sliding core to form the fork section and logical parting line blending with noncritical contours. The pattern is easily removed without distortion.

tion of suitable material and the production of an accurate master or a die design. The location of the parting lines is the most important factor in obtaining consistent pattern and casting accuracy. The parting line may determine where and how the part will be gated, which tolerances will be held most closely to the desired limits, where or whether identification or functional numbers and letters may be cast and to what extent, if at all, the parting lines will be visible on or modify the dimensions of the pattern and casting.

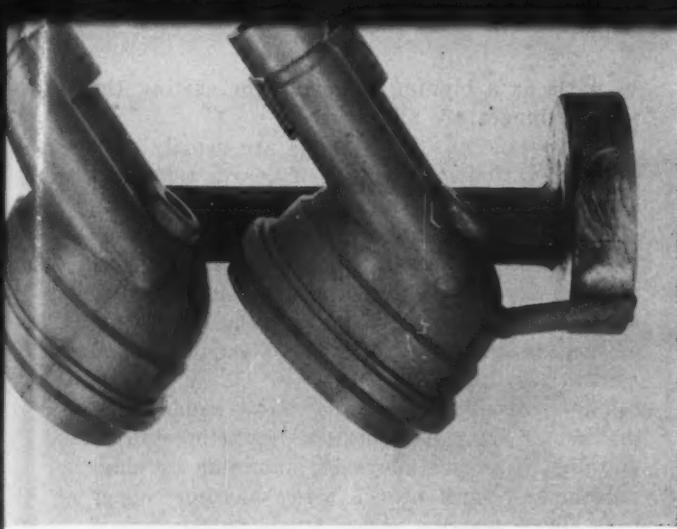
Ease of removal of the pattern from the die, whether insert cores, draw cores, or self-forming cores are to be employed, and the inherent amount of pattern distortion to be encountered are also influenced by the location of the parting. Some designers and die shops place undue emphasis on the avoidance of loose or draw cores and compound parting lines, in their efforts to reduce die costs. Single parting, coreless dies are cheap, but the implicit function of the tool is destroyed when it is not possible to extract the still-soft patterns from the cavity without distortion.



CURVE for a typical cristobalite investment, showing tendency for the expansion and contraction curves to diverge on heating and cooling. Pronounced recrystallization on cooling under 600°F prevents use of molds at lower temperatures, because extreme cracking or total destruction of the mold cavity will occur.

The handling of the die largely determines its effective life. Usefulness of the die usually ends when the flash at the parting line or around the cores interferes with the function of the casting or is so great as to prohibit effective cleaning of the castings. A steel die is considered to have unlimited life when used to mold wax patterns. The actual life is determined by wear of the cores, guides and slides.

In the production of waxes or plastics of very small, very thin patterns requiring hot materials and high injection pressures, flashing around the cores and parting lines, not easily corrected in a small fragile pattern, may limit the die life to as few as 100,000 pieces. Use of hardened alloy steel will prolong useful die life; machinability of such materials frequently prohibits their use for the more complex small parts.



**GATED WAX PATTERNS** of the ignition harness part, showing how orientation of the part must be considered for minimizing solidification distortion of the numerous circular openings in the piece.

In production of a pattern die, the intent is to provide a tool in which deviation from design tolerance is held to 1/10 or less of the total permissible deviation. It is obvious that the cost of the die is governed by the closeness of the specified tolerances. For a dimension to be held to plus or minus 0.005 in., the toolmaker must work to plus or minus 0.0005 in. For plus or minus 0.002 in. in the casting, the toolmakers must attempt to work to 0.0002 in. It is desirable that all nonfunctional dimensions never be specified closer than 0.010 in. in order to simplify the die or master construction problem and thereby minimize tool costs. It is comparatively easy for a competent toolmaker to work to tolerances of 0.001 in. in a die or on a master pattern. The fact that dies can be held to tolerances of 0.0002 in. is no justification for requiring such expensive working unless the function of the casting can justify it. This seldom is the case.

Three materials are now used for production of disposable patterns. These are the various wax compounds, polystyrene plastics and low melting metal alloys. The greatest number of investment molds are formed from wax patterns. Each foundry has one or more wax compositions. These may vary to a greater or lesser extent from others, for such reasons as economy, theoretical or actual differences in handling and storing, and greater or lesser shrinkage factors. Wax patterns have been used in the lost-wax art techniques for over 400 years. In spite of the undeniable deficiencies of wax compounds, it is still true that they can be used to make the most precise, complete and detailed patterns for quantity production of investment castings.

The second most widely used pattern material is polystyrene. This material produces patterns with substantially better mechanical properties as compared to wax. However, the much higher cost of plastic injection dies, combined with the magnified and still unsolved problem of solidification shrinkage of plastics in heavy sectioned pat-

terns, precludes general adoption of plastic patterns for production quantities under 25,000.

Part design and desired casting tolerances further limits the present applicability of polystyrene. Where suitable, plastic patterns help reduce per-piece costs and often permit extended production runs to be made with very close interchangeability of final castings.

Metal pattern experiments have not as yet progressed to the point where extensive commercial production has been successful. Various attempts to use such metals as Woods metal or Cerro-tru have been made. Problems of metal-ludgy and inability to completely void the mold cavities of the metal have limited the applications of these patterns. Some commercial applications of bismuth amalgams have been reported from Australia. These mercurous alloys require heat for their extraction and would be banned in most American plants due to the extreme toxicity of mercury fumes.

The most promising metal pattern process involves use of frozen pure mercury. Various applications of this technique have been reported in conjunction with specific experimental casting projects not suited for quantity production. Mercury patterns are chiefly advantageous for parts involving very heavy masses which would tend to cavitate if made, by present techniques, from wax or plastic.

Mercury is unique in having negligible shrinkage in the solid phase and negative expansion for a few degrees of temperature rise following melting. This results in minimum part distortion traceable to the thermal effects of the pattern itself. This alone is of relatively minor importance in the actual size and shape of the final casting. Other considerations far outweigh this factor at the present time.

#### Process Is in Laboratory Stage

The necessity of handling the frozen mercury at temperatures of from  $-70^{\circ}$  to  $-100^{\circ}\text{F}$  and of controlling the dip investments, which are usually held to  $-130^{\circ}\text{F}$ , so far has limited the mercury pattern process essentially to the laboratory stage. However, its use has been extended to special design problems where exceptional efforts have been justified.

The thermal changes encountered in commercially useful pattern materials usually can be limited in their final effects on part sizes. This is done by adjustment of temperatures and pressures used to inject the materials into the dies and control of the time of dwell within the die, under pressure, prior to pattern removal from the die. Various techniques are now used to eliminate cavitation of heavy wax sections. In a properly designed and operated pattern die, production of wax or plastic patterns should be possible to within 0.001 in. variation.

Expansion or contraction of patterns due to surrounding temperature variations can be cor-

rected by controlling the temperature of the pattern during investing. This is most easily done by controlling the temperature of the investment while it is being poured around the patterns and before it sets. This affords a means of adjusting the overall size of the patterns, within limits, and a way of standardizing the wax or plastic size regardless of room temperature changes.

Present wax compositions are somewhat prone to distortion while stored at room temperature. Very complex waxes involving widely varying sections or including numerous heavy sections must be stored on jigs. Polystyrene patterns are not subject to warpage during storage.

#### Precision Limits Listed

Limits of precision of patterns include the effect of the parting lines, temperature and pressure used to inject the pattern materials, time of dwell prior to ejection, distortion during ejection from the die (a negligible factor in a properly designed tool), warpage during cooling, distortion during cleaning, gating and clustering, the necessity of having gates, risers or vents and orientation of the pattern in the die and then in the flask.

The precision attainable on the surface to which the gate is attached is seldom closer than 0.010 in. as cast. All heavy sections must be gated or risered to avoid cavitation. Heavy sections, therefore, cannot be held to close overall tolerances. Finish stock for removal by grinding, turning or other operations must be provided if the function of the part requires close dimensions on the gated or vented surfaces.

Location of the gate controls the final shape and size of the pattern as well as the resulting casting. This is due to the distortion induced in the pattern by the position of the gate, as well as the equilibrium of stress attained in the solidifying pattern. The gate determines the shape of the casting whenever it is the cause of unbalance in the direction of solidification and the shrinkage stresses in a symmetrical shape. Circular parts, for example, may come out oval unless they are gated directly on center.

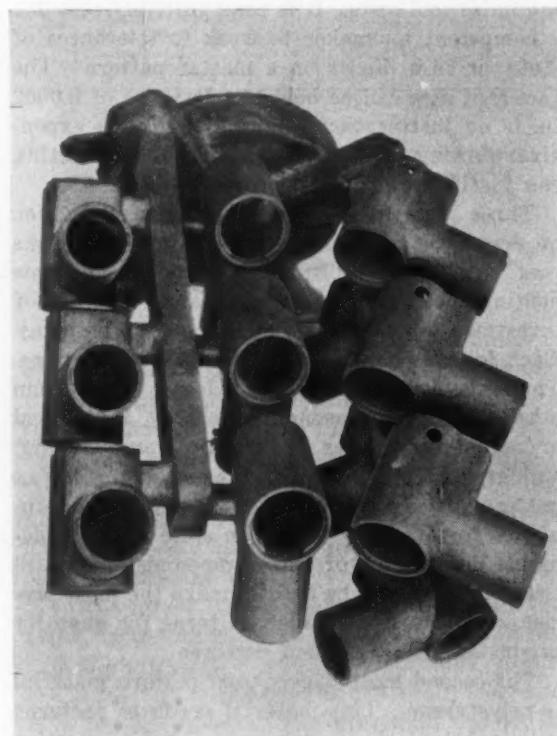
The type of investment material to be applied in casting any part is determined largely by the temperature to which the metal must be heated for pouring. Investments divide into two types: (1) Those used for castings of the low-pouring (under 2250°F) alloys of aluminum, magnesium or copper bases; (2) alloys poured at high temperatures (over 2500°F), which include all ferrous alloys and refractory non-ferrous alloys of the cobalt, chromium, nickel, tungsten, molybdenum, vanadium and columbium types. It is universal practice to use a single mix type of investment, usually based on gypsum or plaster

of paris as a binding material, for casting the lower temperature alloys.

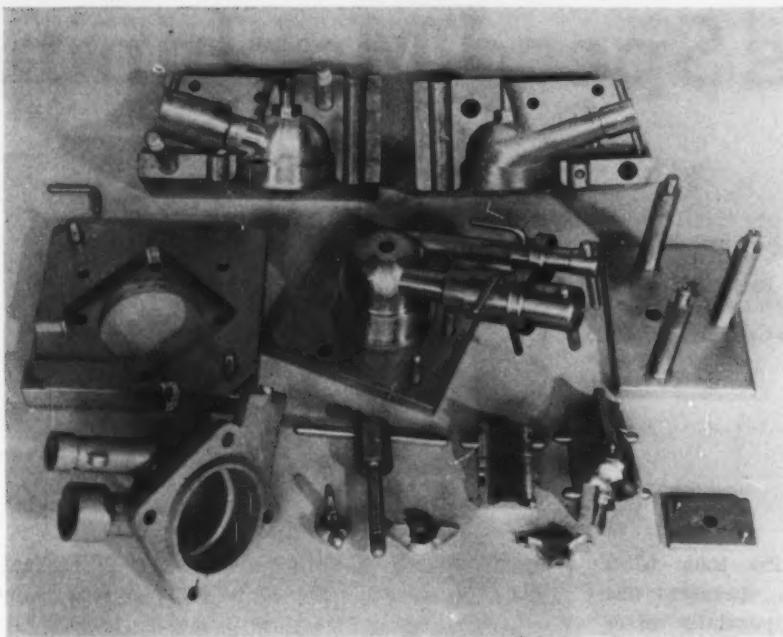
Such single mix investments are usually composed of various proportions of quartz, tridomite, crystobalite, fused quartz, silica sands and calcium sulphate. A typical mixture consists of 50 pct crystobalite, 20 pct tridomite and 30 pct plaster of paris. The most important factor to consider in this type of mold is the correlation of heating and cooling curves of expansion and contraction.

The necessity for cooling these molds from maximum firing temperature to temperatures suitable to receive alloys of aluminum or magnesium and some of the lower melting copper base alloys, places a severe strain on the investment whenever contraction rates differ very widely from the expansion rates encountered in firing the mold. Cracking, chipping or spalling of the mold cavities can seriously affect the cleanliness and soundness of castings.

The ferrous and refractory metals are usually cast into molds which were formed from two different investments. The first material is a dip coat. This is applied to the gated patterns to impart a fine finish to the castings and to prevent contact between the metal and the coarse, porous and usually chemically active material used to form the bulk of the mold. The expansion characteristics of the coating and backup investments must be closely matched, but due to the fact that no cooling of these molds is attempted, the contraction characteristics need not be governed.



CLUSTER of silicon bronze castings after removal from the investment. Positioning had to be considered to minimize distortion in the three circular openings in three separate planes of the casting.



STEEL DIE used to make patterns for an aircraft ignition harness, illustrating a die problem which could not be solved in soft metal. The die consists of 18 separate pieces, several compounded from individually machined sub-components. A gated wax pattern made in the die is shown in the lower left corner.

Where the low temperature single mix investment molds may be filled with metal varying from 700° to 2250°F and the mold temperature varying from 600° to 1200°F, the ferrous and other high temperature alloys, which are poured from 2500° to 3500°F metal, fill molds which are at their maximum firing temperature of from 1600° to 2000°F. Unless the dip coat matches the backup in expansion, severe spalling may occur, rendering the molds or casting useless.

All of the investment materials undergo fairly complex wet solidification contractions upon setting up and varying proportionate expansions upon firing. Close study of these factors, coupled with rigid control of investment mixtures, water to powder ratios, temperatures, setting times, vibration and vacuuming treatments during setting, firing cycles and, where necessary, cooling cycles, permits compensation for the net result of the variables to be incorporated in the design of the master pattern or die.

Vacuuming and vibration of the investment are done to minimize the entrapment of air bubbles against the pattern faces and in corners or interior cored sections. Finishing removes surplus metal formed by droplets traceable to trapped air and excess metal due to filling where investment chips have fallen away and out of the mold. Superficial effects of the investment, such as streaks, seams, hairlines and small cracks, must be anticipated in all investments to a limited extent.

Removal of the pattern from the mold must be closely governed to avoid distortion of the cavities and destruction of fragile cores. The differing thermal characteristics of the various pattern materials governs the degree of size change which inherently applies to each. Of the various commercially used disposable patterns, polysty-

rene plastics have the greatest tendency to distort the molds during bakeout. The least distortion is obtained while permitting frozen mercury to melt out. This is attributed to the contraction of the metal upon liquification, a characteristic shared by ice.

Numerous efforts to make frozen water patterns, to duplicate the feature possessed by mercury, have so far been without commercial success. Wax patterns, when properly gated, can be extracted from the mold with no known or measurable distortion. This requires a closely controlled rate of heating of the mold to permit the patterns to flow from the mold through the gate and sprue openings at the proper rate.

All of the factors which modify the size and shape of an investment casting, through the steps which lead to the completion of the mold, extraction of the disposable pattern, and firing of the mold to receive the metal, may be controlled to a greater or lesser extent depending upon the precise degree of accuracy required in the final casting and the economic justification for exerting maximum control over every variable encountered.

In normal commercial processing of investment casting, where a correctly designed die for the patterns has been provided and operated correctly, and where the patterns have been gated and invested properly, the final size of the molded cavities, fired and ready to receive the metal, should not vary by more than 0.001 to 0.002 in. per in. from the desired size. Where special controls are justified, deviations from size may be held, in the hot mold cavities, to tolerances less than 0.001 in. per in. However, the size of the final casting is affected to a far greater extent by the process operations which follow the completion of the mold than by those which have preceded.

# Carbides Speed Machining

By JOSEPH FRISCH

Tool Supervisor,  
Allis-Chalmers Mfg. Co.,  
Milwaukee



ADOPTION of carbide cutting tools to a 75-year old manufacturing operation has enabled Allis-Chalmers to partially offset higher labor and material costs with a marked reduction of production time.

More efficient use of machines and allied equipment in various machining operations has contributed to overall streamlining of this operation. However, most of the mechanical improvements in finishing chilled iron rolls of a hardness of 70 to 90 Scleroscope are credited to the adoption of carbide tools which require less power to operate and substantially reduce time and extra operations associated with the tools and techniques used in the past. These tools are 91.5 RA harder than the previously used high carbon steel cutters and possess much greater cutting power.

Like other chilled iron roll finishers, the company has for years depended on high carbon steel cutters. Rising production costs led to the adoption of tungsten carbide cutters and a change in method of application.

Considerable savings were realized in the first operation to which they were applied, that of scraping, chamfering and cutting-off of chilled iron rolls. Although no actual time studies and production records had been kept on the old operation, unofficial statistics compiled by the company's maintenance and tools department show that it took 27 hr to complete this first step on rolls 10 in. in diam and 42 in. long, turned on specially designed, belt-driven machines at 1½ rpm, using 3x½-in. tools, 6 in. long.

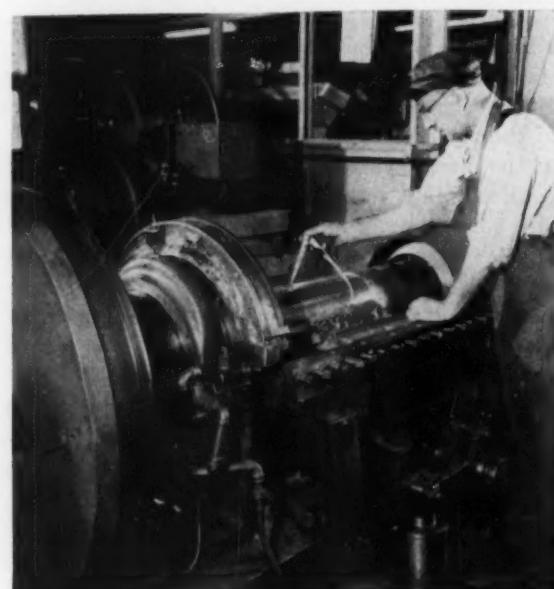
Greater cutting efficiency of tungsten carbide tools permitted motorizing of this equipment and increasing machine speed to 5 to 12 rpm, resulting in vastly improved initial machining and considerable savings in time required for the operation. Another improvement resulting from the change to carbide cutters was the addition of an air feed to replace the old hand lever type which could not accommodate speedier cutting.

With tungsten carbide cutters, the amount of feed necessary in this operation depends upon

roll hardness and pressure used. At present, pressure ranges from 20 to 40 lb and need not be increased as long as tools are turning a fair sized chip. Whenever more than 40 lb of pressure are needed, tools are sharpened.

## Tool Arrangement Revised

A good part of the benefits derived from the use of tungsten carbide cutting tools results from their mode of application and not from their nature alone. Tools now used measure 5/16x¾ in. and are 1¼ in. long. Best results have been achieved by arranging them in series of 10 in specially built holders equipped with clamping faces and offsetting them 9° against the surface of the roll. This tool design and arrangement permits three additional cuttings with the same tools since all four corners can



SPECIAL LATHE. This machine was designed and built by Allis-Chalmers for turning diameter and cutting off chilled iron rolls. Ten carbide tools are clamped in the holder.

# of Chilled Iron Rolls

Allis-Chalmers has adopted carbide tools for all machining operations on chilled iron rolls. The change has increased accuracy, led to improvements in methods and equipment, and resulted in substantial reduction of production time.



**CORRUGATING MACHINE.** Equipped with a special carbide-tipped tool, this planer is being used for corrugating a grain mill roll.

be used as cutting edges by merely reversing their position in the holder.

Before tungsten carbide tools were introduced, boring and rough facing on rolls required 10.2 hr because high carbon steel cutters restricted the old, belt-driven engine lathes to 8 rpm.

Previous improvements and the adoption of tungsten carbide cutters enabled lathe speed to

be increased to 46 to 63 rpm and cut boring and rough facing operations to 3.00 hr for 10x42-in. rolls. Operators now run two machines at the same time and are, in addition, able to bore two rolls per setting on each machine.

The rough cutting operation is followed by facing of roll ends. A finish cut is then made on the bore, followed by reaming, after which stub shafts are pressed in from both sides.

Roll shaft journals, bearings and collars are also being cut with tungsten carbide tools, with savings in quality and quantity comparable to those realized in roll finishing. These were formerly turned and then finished by filing and polishing with emery cloth. These are now turned 0.020 in. larger and ground with a grinding wheel 2 in. wide and 30 in. in diam resulting in faster machining, greater accuracy, and a much finer finish than was possible in the past. The file and emery cloth have been discarded.

## Roll Grinding Is Faster

The more accurate machining with tungsten carbide tools has also simplified and accelerated roll grinding. Two 1½x14-in. wheels were used in the old method, while a single 5x30-in. diamond dressed abrasive wheel is being used now. The two 1½x14-in. wheels, one on each side of the roll, moved horizontally across its diameter and were fed individually by hand wheels. This process required the operation of two machines, one for rough and the other for finish grinding.

The single 5x30-in. grinding wheel now used is stationary. The roll moves back and forth horizontally across the outer diameter of the wheel. As the table completes its travel, the stop engages an automatic feed mechanism which moves the wheel 0.002 in. per trip towards the roll enabling rough and finish grinding on the same machine in a single operation.

After the rolls are ground, they are taken to a horizontal milling machine for milling of shaft keyways. These required two cuttings when high speed steel cutters were used because the

same tools could not be used to mill the radius. With tungsten carbide tools, keyways, complete with radius, are now milled in a single operation with the same cutter.

Circumferential or longitudinal corrugating of roll diameters is the last step before rolls are ready for mill use. Allis-Chalmers is using two specially built planers for longitudinal cuts. These are equipped with an indexing mechanism which rotates the roll at the end of each stroke across its surface. Spiral corrugations in longitudinal cuts vary from  $\frac{1}{4}$  to 2 in. from center line as required, either right or left hand. Corrugations specified by certain mills are effected by the use of a taper control, which rotates rolls during the travel of cutters across the roll surface. Planers have had to be equipped with Vari-Pitch speed changers to take full advantage of time savings afforded by the faster and more efficient cutting power of tungsten carbide tools. Planers are now equipped with an indicator

which shows at how many surface feet per minute the tool is cutting.

The latter addition was a mechanical must, since varying flour mill specifications call for approximately 162 distinct types of groovings in machining rolls, and the speed with which grooves are cut depends upon the type of grooving as well as the roll hardness and the fineness of cuts.

Circumferential corrugating is done on a horizontal lathe using a single formed cutter. The solid cutter is serrated with several grooves as required by pitch. These cutters are similar to those used on horizontal corrugations, with the exception that there is no radius on the cutter; it is straight on the face, and each unit is of a different pitch.

The program of adopting carbide tools for machining chilled rolls, and making corresponding improvements in machines and technique, has been put into effect over the past 3 years. The results, in quantity and quality of production, have been excellent. In combating increasing labor and raw materials costs they have fully justified the expense of the changes.

## Radioactive Tracers for Gas Transit Times

DEVELOPMENT of a new radioactive tracer technique for measuring gas transit time in a driving blast furnace was reported recently by E. W. Voice in *Journal of the Iron and Steel Institute*, London. Transit times for the gas through the burden, as well as gas velocities or transit times at the furnace center and inwall were also determined by this method.

A small volume of radioactive radon was introduced into a tuyere, and gases were sampled from a point within the furnace. These gases were analyzed for activity, and the times of transit could be calculated from the results obtained. The radon was projected into the hot blast stream by means of an explosive charge to insure rapid introduction of the maximum concentration of activity.

The radon was placed in four gold tubes about  $\frac{1}{2}$  cm long and  $\frac{3}{4}$  mm in diam. These were attached to a small piece of adhesive tape and wrapped around the end of an electric detonator, which was enclosed in a cardboard tube containing 2 g of ballistite. Upon firing the detonator, the gold tubes were shattered, and the gases from the ballistite charge swept the radon into the tuyere. The system was arranged so that a switch on the gas-sampling apparatus completed the detonator circuit.

A weighted flexible metallic tube was threaded through a length of  $1\frac{1}{4}$ -in. pipe and passed into the furnace through a 2-in. hole above the stockline contour, providing a means for con-

ducting the gases to the external gas sampler. The sampler consisted of a large circular water-filled pan having 30 gas jars arranged around its periphery. The gas inlet below the center of the pan entered a rotating radial arm, by which the gas could be directed to each jar in succession and sampled by water displacement.

The first movement of the arm closed the electrical circuit and fired the detonator in the burster container on the tuyere; the arm made a complete revolution in 22 sec. By this means, samples of gas were obtained at known intervals after the radon entered the tuyere. A correction was applied for passage time of the gas in the known length of flexible pipe.

After storage for 5 hr to attain radioactive equilibrium and maximum activity, the gas samples were analyzed for radioactive content. Since the radon or disintegration products would emit alpha, beta or gamma radiations, depending on the time interval between sampling and analysis, a Geiger Muller counter, fitted with thin mica window, was used in conjunction with a Dynatron scaler.

The time scale was corrected for both the gas transit time in the flexible pipe and the uneven movement of the hand-operated rotary arm of the sampler, assuming the rate of flow through the pipe to be constant. Previous experience had shown that gas flow from the pipe was steady for much longer periods than the short duration of the experiment.



# Formability Featured AT JOINT ASM MEETING

Microstructures, soap bubbles, sheet steel formability and heat treating were advanced another notch last week when many of Pennsylvania's top metallurgists took off to the hills loaded for bear. Most of the 180 technicians from the five surrounding ASM chapters got their limit. The affair was a two-day, five technical session, seventh biennial interchapter meeting held at State College, Pa., June 16 and 17.

The five chapters cooperating with the Division of Metallurgy of Penn State College conducted the event which racked up a record attendance. The ASM chapters included Lehigh Valley, Northwestern Pa., Penn State, Philadelphia, Pittsburgh, Southern Tier and York chapters. Featured in the technical program was Dr. Cyril Stanley Smith, Director, Institute for the Study of Metals, University of Chicago.

Dr. Smith, one of our most eminent scientists opened Friday's session with a talk "Microstructure of Metals."

He concentrated on old fashioned metallurgy. He told the group that much of his talk could easily have been given back as far as 1880. Scientists of that day had all the necessary equipment, had seen the microstructures and were acquainted with the basic theories of surface tension and the mechanics of crystalline structures.

The speaker illustrated soap bubble formation and demonstrated its similarity to the crystallization of single phase metals. The formation of crystals is influenced by three major factors: Surface tension, diffusion and crystallinity.

In a way Dr. Smith lent considerable credulity to some soap advertisements as he showed how a soap froth does everything a single phase metal does in forming crystals. Grain boundaries in metals form at 120° angles just like bubbles and crystalline directionalities are very similar. One exception is the twinning characteristics in some forms of metals. Another is that grain size of soap solutions continue to grow while that of all metals is stopped at a certain point.

#### Cites Fundamental Equation

Dr. Smith pointed out one very fundamental fact in crystalline structures has been too often overlooked. He demonstrated with a simple formula how the number of polygons in many aggregates of grains or crystals, *minus* the numbers of edges *plus* the number of corners of the geometric shapes involved always equal 1. The speaker stated this simple equation should be taught engineering students or even high school students as it greatly simplifies or clarifies ones understanding of geometric structures.

Much of full significance of metallic structures is missed because ordinary microstructures are 2-dimensional cross-sections of 3-dimension structures, the group was told. In describing the manners in which space is filled or the creation of a solid material (excepting the space always existing between atoms) Dr. Smith carried the simple hypothesis further. Triangular crystals or grains meet in a way that the number of grain boundaries involved at the point of juncture always equals 6. Simply

stated mathematically he wrote the equation,  $\Sigma(6-n) P_n E_b = 6$ . He then illustrated how the standard ASTM grain size charts can be used to prove this equation.

More important is the fact that in the 3-dimensional plane the average number of sides or edges on the polyhedrons will number 5.12 sides. This is true of practically all crystalline substances and also holds true for the structure of animal fat. The ideal shape in filling space of any kind Dr. Smith told the group is Kelvin's 14-sided polyhedron.

Of wide interest was the afternoon session on formability. The chairman was John R. Low, Jr., General Electric Co., who presided over the meeting in which three papers were given. Two research metallurgists from Bethlehem Steel Co., S. Epstein and J. W. Frame led off with the "Metallurgical Aspects of Deep Drawing Steels." In their data they not only compared rimmed v. Al killed steels, but included V-bearing rimmed steel data.

#### Can be Shipped in Coils

The old disadvantages of the non-aging Al killed steels are now overcome with the new V rimming type. The two major drawbacks to Al types are poorer surface and the fact that Al killed steels should not be shipped in coil form if prime surface is to be had. The V grade has the advantage of the good surface of rimmed steel plus the non-aging characteristics plus its ability to be shipped in coil form. This grade can also be cold reduced to greater degree and still possess the optimum ferrite grain size for deep drawing applications. Mill practice is to finish hot rolling over 1600°F and coil hot without water spray cooling. This practice is very seldom satisfactory on other types of drawing quality sheets. Mr. Epstein brought out in his talk the fact that total elongation in such sheets is not as important as uniform elongation which takes place before the steel starts to thin or neck down. V rimmed steel has as much uniform elongation before necking as Al killed steels, both of which are better in this regard than straight rimmed steel. The new bulge test was discussed and this test is a more precise measure of drawing quality than the old Olsen cup test. Bulge test results were substantiated with the torque magnatometer. V steel costs \$4.50 more per ton to make than Al killed but fabricators and mills believe it's worth it in many applications.

Later in the same formability session W. T. Lankford, Carnegie Steel Corp., discussed "New Tests for Drawability." Information compiled

comparing mill tests with actual press performance on front fenders was evaluated. R values have been compiled and show a remarkable correlation between good and bad drawing quality. Transverse as well as longitudinal tests were compared. It was found that the heats that performed best in the actual drawing application were those with *n* value above 0.240 and longitudinal *R* value above 1.50. The *n* value is the strain hardening exponent that has recently been used in new drawability tests.

#### Papers on Formability

The formability session held the following day featured a talk by R. S. Burns of Armco Steel Corp., on "Cold Forming and Deep Stamping of Steel Sheets." In the same session A. M. Bounds and H. W. Cooper of Superior Tube Co., presented a paper on the working and forming of titanium and similar reactive metals. Mr. Bounds emphasized the fact that small amounts of gases like oxygen and nitrogen form alloy systems in titanium and must therefore be considered when discussing the properties of the metal. Work hardening curves and transformation temperatures of both zirconium and titanium were discussed. Some of the working and fabrication methods of titanium and zirconium were covered as well as the heat treatment and annealing of these metals. The authors stressed that it must be remembered that the reactive metals are different: All of the reactive gases may be absorbed and most of them cause embrittlement. Titanium and zirconium possess an hexagonal crystal structure and their working properties are governed by that fact. Although both metals, when in the proper form, are easily cold rolled they are difficult to cold draw because of their galling and seizing characteristics.

#### Interest High at Gas Session

Another technical session of high interest was the gases of metals meeting. C. E. Sims, Asst. Director of Battelle Memorial Institute, was the chairman. J. H. Enzian from Jones and Laughlin Steel Corp., gave a talk on the metallurgical aspects of nitrides in steel. The methods of analyzing for nitrogen content by determining the amount of aluminum nitrite present were presented along with the function of nitrogen in aging and precipitation hardening systems. G. Derge of Carnegie Institute of Technology, spoke on the sampling and analysis of steel for hydrogen. Three Penn State metallurgists, H. M. Davis, J. H. Keller, and P. K. Chu, spoke on "The Behavior of Hydrogen in Sheet Steel." A comprehensive program on heat treating was held Friday afternoon under the chairmanship of R. W. Lindsay, Asst. Professor of Metallurgy, Penn State.

# Sigma Phase Mystifies ASTM

**A**BOUT 2000 members of ASTM attended the 53rd annual meeting held at Atlantic City last week. This society is responsible for over 1600 specifications covering all major industrial materials.

From June 26 to 30 symposiums were held on quality control, nondestructive testing, high temperature properties, corrosion and erosion, spectroscopy and sigma phase in the metals section alone. Plus these activities, the 71 technical committees and hundreds of subcommittees were busy night and day on specifications of both old and new materials.

A committee on radioactive isotopes was formed. A group for titanium metal was appointed to consider tentative specifications for this fast-growing metal. Materials such as rubber, cement, wood plastics, petroleum, etc., also received plenty of attention. Over 50 exhibits of the latest testing apparatus were shown concurrently with the 5-day meeting.

High on the list of the metal meetings were the 11 technical papers on the sigma phase which occurs in some high temperature and stainless steels. Sigma, long known but little understood, received special treatment. The metallurgists and testing engineers etched it, plotted it on ternary phase diagrams, measured its hardness, ran stress rupture, determined solution temperatures, X-rayed it, cold worked it, heat treated it and finally decided sigma hasn't a real bad effect on the steels anyhow.

Those who thought they knew something about sigma before these meetings learned a great deal—nobody knows very much about it, for sure. Only two characteristics of sigma are generally accepted and confirmed: (1) Sigma decreases ductility, elongation and reduction of area, (2) its embrittling effect is more pronounced at room temperature than at higher temperatures.

Special features of more general interest were the awards for outstanding technical papers previously contributed. The Charles B. Dudley Medal was presented to Prof. B. J. Lazan for his

paper "Dynamic Creep and Creep Rupture Properties of Temperature Resistant Materials Under Tensile Fatigue Loading." Professors D. S. Clark and D. S. Wood, California Institute of Technology, received the Richard L. Templin Award. Their paper was entitled, "The Time Delay For the Initiation of Plastic Deformation at Rapidly Applied Constant Stress." O. B. Ellis, Armco Steel Corp., won the Sam Tour Award for "Effect of Weather on the Initial Corrosion Rate of Sheet Zinc." The Annual Edgar Marburg Lecture on "Chemical Spectroscopy" was delivered by Dr. W. R. Brode, associate director, National Bureau of Standards.

## Gas Turbine Materials

In the corrosion symposium of gas turbine material, G. B. Wilkes, Jr., metallurgical engineer, General Electric Co., West Lynn, Mass., delivered a paper on the stress corrosion test on gas turbine materials and how these materials are affected by the products of combustion of leaded gasoline. Stress corrosion tests were made on 18 different alloys. Tests were conducted under both constant temperature and cyclic temperature conditions. The leaded gasoline used was grade 130 aircraft.

Tetraethyl lead as well as temperature cycling affect the corrosion rates. Under temperature cycling, the metals maintained a higher strength in a reducing atmosphere. High oxygen contents plus lead oxide produce severe corrosive conditions on all alloys. Since air is not particularly corrosive on the alloy tested, the tests seem to prove that cycling alone is the cause of a large part of a loss in strength of the metals used in gas turbines at high temperatures.

The speaker pointed out that the tetraethyl lead used in aviation should not be confused with the automotive type ethyl fluids which also contain a chloride. The agents that are available from combustion to cause corrosion of the

alloys are lead bromide and lead oxide and, of course, any oxygen that is present in the exhaust gases. A special stress corrosion test furnace was built by the Ethyl Corp. in which the test samples could be loaded while being exposed to direct impingement of the hot gases.

A summary of the results is shown in the accompanying table, page 102, in which the alloys are arranged in the order of their corrosion resistance. The figures greater than unity in the table indicate the alloys showed better than expected strength.

The author told the group that based on his research, it appeared logical that lead oxide is a corrodng agent and it is most effective in the liquid state. It can be made liquid by temperature alone, 1630°F, by mixing with lead bromide or by fusing with metal oxide. In the study of the materials covered by this type, this fusion was apparently relatively slow for the iron and nickel base materials, except Inconel. With the cobalt base materials, the fusion was even slower than that on Inconel.

#### Coal Ash Corrosion

In the same session, C. T. Evans, Jr., chief metallurgist, Elliott Co., Jeanette, Pa., presented a paper "Coal-Ash Corrosion of Metals at Elevated Temperatures." This was a report on the cooperative study with the Locomotive Development Committee of Bituminous Coal Research Assn. and the Crucible Steel Co. Tests were conducted on S-588 heat resisting alloy at 1350°F.

The alloy was tested in two different conditions, one coated and one separated with coal ash. Material for both coated and uncoated blank specimens was 1 1/4 in. round, heat treated by solution treatment for 1 hour at 2250°F, water-quenched, followed by aging for 16 hr at 1400°F. The stress rupture specimens of the alloy were coated with a typical coal ash deposit under conditions closely simulating those which might produce coal ash coatings on the rotating blades of gas turbines for coal burning service. Specimens were stressed during the coating cycle to an approximate operating stress of 15,000 psi and were tested at the maximum expected operating temperature of 1350°F. Ash particle size and velocity also approximated the conditions expected for the gas turbines.

A comparison of tests run at the Battelle Memorial Institute and Crucible Steel Co. indicated that no appreciable effect of the coal ash on these alloys can be noticed either in the rupture life or in the ductility to fracture. Strength levels for the 1000-hr life obtained in the Crucible test is somewhat higher than the Battelle test.

In addition to alloy S-588, several other metals



ASTM officers: L. J. Markwardt, assistant director, U. S. Forest Products Laboratory, Madison, Wis., left, is new ASTM president. T. S. Fuller, engineer in charge of works laboratory, General Electric Co., Schenectady, right, is new vice-president.

of interest to the builders of gas turbines for locomotive service were also tested in unstressed conditions at 1000°, 1350° and 1500°F, in contact with representative Ohio Coal Ash. One of the chief difficulties anticipated in the use of pulverized coal as a fuel for gas turbines is the possible erosion of the blades and other metal parts by the fly ash contained in the hot combustion gases. The results of this research indicate that many of the fears of those concerned with the development of coal-fired gas turbine locomotives are now obviated.

#### Proper Stress Rupture Testing

Three others collaborated presenting a paper "The Effect of Environment on the Stress Rupture Properties of Metals at Elevated Temperatures." This paper was presented by O. Cutler Shepard, Professor of Metallurgy, and Willis Schalliol, graduate student, Stanford University, Stanford, Calif. High temperature corrosion is a chemical attack of a metal or alloy by substances present in the surrounding atmosphere, the authors declared. The factors controlling corrosion are temperature, pressure, rate of flow and composition of the surrounding material. Much of the high temperature corrosion tests and reports have been concerned with the rate of surface attack. The authors pointed out that stress and temperature are important factors in both creep and rupture tests and the effect of environment has usually been neglected. Stress rupture tests were, therefore, run in controlled atmospheres on low carbon steels and with Hastelloy C. Tests were run in a variety of atmospheres and the results indicate that the environment exerts an important effect under stress rupture properties. The effects noted amounted to differences in the amount of intergranular cracking and differences in time to failure. The stress rupture life of Hastelloy C

specimens was considerably longer in other environments. The authors told the group that, based on their findings, they believed it dangerous to continue using tests in air to predict surface behavior in other types of environment.

#### Alleged Sigma Phases

Eleven papers were devoted to a subject close to the heart of many metallurgists, sigma phase. This phase of many metals is one of the most interesting and until recently unrecognized characteristics in certain classes of alloys. The sigma phase is a hard, brittle, non-magnetic solid solution of complex crystal structure based upon the compound FeCr. The phase is caused by precipitation occurring at temperatures below 1700°F depending on composition. Ordinarily precipitation in sigma is only encountered after prolonged exposure at elevated temperatures, but in alloys that are predominantly austenitic, sigma may form during ordinary commercial heat treatments.

One of the many interesting papers presented was "Identification and Mode of Formation and Resolution of Sigma Phase in Austenitic Chromium Nickel Steels," given by E. J. Eulis and G. V. Smith of the Research Laboratory of U. S. Steel Corp., Kearny, N. J. In this paper the authors point out that the elements commonly added to the austenitic stainless steels for one purpose or another, such as molybdenum, columbium, titanium and silicon appear to enlarge the existence range of sigma. The microscope is one of the easiest methods of identifying the phase and this method as well as X-ray diffraction and magnetic permeability tests were used by the authors. Nine different types of austenitic steels were investigated all of which contained sigma, carbide or ferrite, or a combination of these constituents.

In the paper, the etching reagents which can be used to identify the phase were discussed. These reagents are classified into three groups; acid, alkaline ferricyanide and electrolytic reagents. The acid etchants attack austenite leav-

ing sigma, carbide and ferrite in relief. The alkaline ferricyanide at room temperature attacks only carbides whereas at boiling temperature it attacks sigma, carbides and ferrite while not affecting the austenite. Electrolytic etching reagents attack sigma and carbides very rapidly and ferrite and austenite very slowly. The authors told the meeting that the identification of sigma by X-ray diffraction leaves no doubt as to its occurrence. Supplementary magnetic permeability test on the specimens containing sigma substantiated further the X-ray findings, in proving the absence of ferrite. Micro-Vickers hardness tests on a large particle of sigma in one of the steels was extremely hard with a hardness of approximately 750 DPH.

#### Carbides Precede Sigma

The second part of the investigation covered the modes of formation and resolution of sigma. This work was done on stainless type 316. At 1500°F it was found that sigma forms quite sluggishly in this steel. It is formed by a process of nucleation and growth directly from austenite. No evidence of ferrite as an intermediate product was observed. Carbide precipitation precedes the formation of sigma and goes to apparent completion in a relatively short time. Precipitation of sigma itself had apparently not attained completion at the end of 3000 hr. Both carbide and sigma form in the grain boundaries decreasing ductility of the steel at room temperature.

This same investigation carried out at 2000°F show that ferrite occurred as an intermediate product in the process of solution of the sigma in austenite. Whether sigma always dissolves by this mechanism is not known. High temperatures at least appear to favor this condition.

Most of the previous work done on the sigma phase of the iron chromium system has been done on alloys containing 25 pet or more chromium. A. J. Heger, research associate of Carnegie-Illinois Steel Corp. of Pittsburgh, reported on "The Formation of Sigma Phase In 17 pet Chromium Steel." Mr. Heger told the

#### NEW ASTM DIRECTORS



NEWLY ELECTED members of ASTM board of directors. Left to right: B. A. Anderton, consultant, research and development department, The Barrett Div., Allied Chemical and Dye Corp.; Edgewater, N. J.; R. H. Brown, sales engineer, Parks-Cramer Co., Fitchburg, Mass.; D. K. Crampton, director of research, Chase Brass and Copper Co., Waterbury, Conn.; H. G. Miller, mechanical engineer, Chicago, Milwaukee, St. Paul & Pacific RR Co., Milwaukee; and J. R. Trimble, assistant manager, Dept. of Metallurgy, Inspection and Research, Tennessee Coal, Iron and Railroad Co., Birmingham.

meeting that probably the reason sigma phase had not been reported in iron chromium alloys containing less than 25 pct chromium is that materials investigated were not held at temperatures long enough to permit sigma to form.

Using cold work and extended heating periods at 900°, 1050° and 1200°F, the author reported that sigma phase was formed in commercial 17 pct chromium steel, type 430 stainless. At

#### COMPARATIVE CORROSION RESISTANCE OF HIGH TEMPERATURE ALLOYS

Alloy	100 hr- 20 hr	100 hr- 20 hr	100 hr- 100 hr	Crossing Point 4
	1	2	3	
Inconel	1.30	...	1.90	...
Vitallium	1.23	1.18	1.54	2
0059	1.08	1.16	1.31	7
I-284	1.05	...	1.27	70
61 Alloy	0.97	1.01	1.17	80
S-816	0.93	...	1.19	100
Med. Inconel	0.93	...	1.41	300
S-495	0.81	0.96	1.17	...
Timken 16-25-6	0.80	...	1.13	320
19-8 DL	0.79	0.84	0.94	300
Haystelloy B	0.77	0.91	1.06	165
17W	0.77	...	0.98	<1000
N-155	0.73	0.66	0.82	20
N-153	0.72	0.72	0.95	...
Nimonic 80	0.68	1.03	1.10	550

Column 1—Ratio of the 100-hr cyclic temperature oxidizing atmosphere strength to the 20-hr constant temperature air atmosphere strength.

Column 2—Ratio of the 100-hr cyclic temperature, reducing atmosphere strength to the 20-hr constant temperature air atmosphere strength.

Column 3—Ratio of the 100-hr cyclic temperature oxidizing atmosphere strength to the 100-hr constant temperature air atmosphere strength.

Column 4—The point in time at which the constant temperature oxidizing atmosphere strength became higher than the constant temperature air atmosphere strength.

900°F this phase is precipitated as particles finally dispersed to be identified. The phase at 1050°F, however, formed as large particles and was positively identified as sigma. Little, if any, of this phase formed at 1200°F.

The author concluded from his investigation sigma is a stable phase in 17 pct chromium steel at temperatures below 1200°F. The present iron-rich boundaries of alpha plus sigma in the iron carbon diagram must be shifted to lower chromium contents. Cold work is a useful method for accelerating phase changes in these systems where solid state reactions occur at low rates.

Messrs. V. T. Malcolm and S. Low, director of research and research engineer respectively, of the Chapman Valve Mfg. Co., Indian Orchard, Mass., reported on the problem of structural stability of cast austenitic steels when operating for long periods of time at temperatures from 1000° to 750°F. Six austenitic cast valve and fitting steels were investigated. Three of the alloys were 18-8 to ASTM specification 157-44, and three of the cast alloys were 16-35 to ASTM specification A297-49-T. Identification of the sigma phase was accomplished by means of metallographic and X-ray diffraction techniques.

Now there is no doubt that the embrittling sigma phase is present in the three 18-8 type steels. Considerable difficulty was encountered in conclusively identifying the cause of the em-

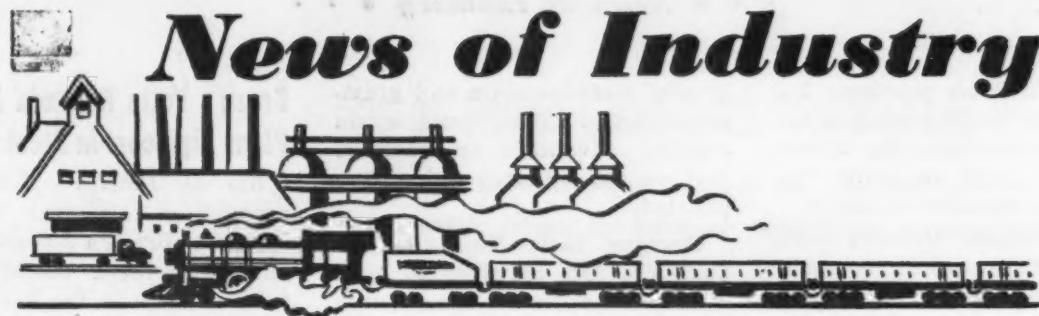
brittling effect observed in the 16-35 type alloys. Metallographic examination disclosed that a second phase was precipitated during long time aging at elevated temperatures. This constituent was too fine to resolve at a magnification of 2500X. Non-extractive and extractive X-ray diffraction techniques also fail to identify the constituent as sigma phase. Although the embrittling phase could not be conclusively identified as the same sigma encountered in 18-8 alloys, the author has expressed the opinion that the embrittling phase is closely related to conventional sigma. The author declared that the embrittling effect of sigma phase is not a metallurgical problem alone. If the mechanical engineer insists that the entire problem requires the metallurgist to devise a sigma free, or what is probably an embrittlement free steel, rather than recognizing the effect of sigma is also a design problem, we can hope for little progress in this field.

#### Stabilizing Elements Increase Sigma

As stated in previous papers additions of some of the stabilizing elements of 18-8 steel increases in precipitation of the sigma phase. W. O. Binder, research metallurgist, Union Carbon and Carbide Research Laboratory, Inc., Niagara Falls, N. Y., reported on the structure and impact resistance of columbium-bearing 18-8 steels after exposure at elevated temperatures. The influence of columbium on the impact properties of 18-8 has been studied in steels containing 8 to 16 pct nickel and up to 3 pct columbium. Solutions of more than 2 pct columbium decrease toughness in the annealed condition due to the formation of complex carbides. Long heating 1200° and 1600°F, Mr. Binder reported, has no significant influence on impact toughness of steel containing up to 2 pct columbium but it is more detrimental to higher columbium steel.

Positive X-ray identification of sigma was obtained after a long period of heating at 1200°F over the range of 8 to 16 pct nickel and 0.75 to 3 pct columbium. These steels do not form large amounts of sigma even though strained at elevated temperatures. Cold working, followed by low temperature annealing, accelerates the rate of precipitation of the phase and favors particle growth. However, high temperature annealing inhibits precipitation and particle growth. The precipitation of sigma phase in a critical particle size has a beneficial effect on creep strength.

Not mentioned in the technical discussion is the fact that ferro-columbium has recently shown very substantial increases in tantalum content. Metallurgists working with the columbium bearing 18-8 steel are vitally concerned about this problem. High-grade ferro-columbium not containing appreciable amounts of tantalum is becoming increasingly difficult to get. It takes a lot more tantalum to stabilize the same amount of carbon as it does columbium. The exact effect of tantalum on 347 is now being investigated.



# News of Industry

## The State of Industry

New York—Now that his hand has been called it is up to Stalin to decide how big the shooting war in Korea will become.

Meanwhile, military, government and industrial officials are quickly rechecking America's potential to meet the emergency—whatever it might be.

The Iron Age editorial staff has been busy checking too—trying to evaluate what demands might be made on industry, and how well prepared industry is to meet them.

It now seems certain that demands will call for high production—the only question is whether the goods will be for war or peace.

## Elevator Charging System Planned for Armco Openhearts

Middletown, Ohio—Armco Steel Corp.'s unique new elevator system for charging scrap and other materials into furnace in its new openhearth shop here will reduce charging time from  $3\frac{1}{2}$  hrs to  $1\frac{1}{2}$  hrs, a 57 pct speed-up.

Westinghouse Electric Corp. will install the four special hydraulic elevators, which will serve three openhearts. The job will be started this summer.

Each elevator will be fitted with a 10 x 20-ft platform and will lift charging buggies 20 ft from yard level to the charging doors. The elevators are designed to lift 45,000 lb in 30 seconds and a maximum of 60,000 lb in 38 seconds. They will be loaded at right angles to the furnace and will revolve  $90^\circ$  to permit unloading in line with the furnace doors.

## High Production—For Peace or War?

**War clouds seen as an impetus to demand . . . Short supply items, manganese, steel, may be scarcer . . . Industry strength is greater than ever before . . . Steel prepared.**—Staff Report.

New York—So far the tense international situation has dictated no sweeping production changes for industry. But it has already aroused a great deal of speculation among the men who handle sales, production and purchasing. To them it spells more demand.

People who had been holding off purchases of automobiles, refrigerators, washing machines and other items will rush into the market—for fear that future government orders will blot out any chances they had of getting these products for a long time to come. This means more sales, more production—wherever possible, and an even greater amount of catch-as-catch-can procurement.

**Shortages Expected**—Materials which are now in short supply will become even more scarce. Among these are steel, manganese, tin and chromite. The Munitions Board will probably step up buying for the strategic stockpile. This would reduce the amount of material immediately available to industry. Most items in the stockpile are seen as in good shape.

**Tempo in Washington**—Passage of the draft extension includes standby provisions to allocate steel and seize plants. Defense spending will be accelerated—either with new appropriations or by faster spending of money already appropriated—both for U. S. and foreign aid. Manpower con-

trol and allocations legislation is ready, if needed. Renewed pressure for steel expansion, government aid for taconite beneficiation and subsidies for domestic mining may be forthcoming.

**Industrial Strength**—The nation's industrial strength is far greater than it was in 1939, or even in 1941. Such strength is measured in terms of available materials, production capacity, and labor—especially skilled. This is due largely to the high level of the economy during the post-war years, which has encouraged industry to keep seeking new sources of raw materials, expand capacity, and maintain its skilled labor force. But high production leaves far less industrial slack than we had in 1941.

If the delicate international situation takes a grim turn and American industry is ordered back to a war footing, this is what is likely to happen:

**Steel**—This basic industry could return to a war footing almost immediately. Capacity has increased from 81.6 million ingot tons in 1940 to about 100 million tons today. It is still expanding at a rate of more than 2 million tons a year. The same carbon steel products being turned out in record volume to meet peacetime requirements could largely be utilized for war materials.

Producers of alloy steel would

face more difficult problems because of new developments in air warfare—particularly the advent of the jet plane requiring improved high temperature alloys.

**Screw Machine Industry**—Its biggest problem would be manpower. Some skilled workers have scattered since the war. However, given the manpower, materials and tools, the industry could be back on a war footing within 90 days, with production double what it is today. The industry is in better shape than it was in 1941. Equipment available today is about 33 pct more efficient.

The industry has before government officials a master plan of action in event of war. A survey made 2 years ago by the National Screw Machine Producers' Assn. located for the government some 12,000 screw machines, including a breakdown of make, model, and number of various types. Today this survey would be about 60 pct accurate.

**Pressed Metal Industry**—In good shape. About 50 pct of reporting members of the Pressed Metal Institute are working two shifts. More large presses would be needed. But a switch to war production would be merely a matter of quick distribution of orders, production of new dies and the dispatch with which new large presses could be made available and installed.

**Tools and Dies**—Industry is better prepared than in 1941. At the start there would be a shortage of skilled tool and die workers, a fairly chronic condition. A good tool and die worker requires 4 years of apprenticeship, plus additional shop experience. Some companies have set up training programs. Others are trying to build up a pool of trained workers. Employment is relatively high, has picked up in the past 9 months. The industry is accustomed to turning out rush orders.

**Foundries**—Gray iron, steel and malleable foundries are all in better shape than they were in 1941. Following high wartime production, competition and cost consciousness has brought about

greater mechanization and greater efficiency. This would be an especial advantage on castings that are not too large or too complicated.

**Machine Tools**—This vital industry is less prepared to meet wartime emergencies than it was in 1941. It would probably take them 18 months to 2 years to get back completely on a wartime basis. The reasons are lost capacity since the end of the war, low order volume in postwar years, lack of recent heavy foreign buying which helped the industry gear up during the 3 years preceding Pearl Harbor.

**Assembly Lines**—The assembly lines in Detroit can not be converted to wartime production as quickly or easily as a lot of people think. The industry would have to do a complete flip flop. It would take about 18 months to achieve volume output from Detroit. There will be no changeover until orders come from Washington. New car model introductions are likely to be put off, and some orders for long range, specialized tooling may be held up.



**GENTLE KEEPER:** John N. Marshall, chairman of the board of directors and president of Granite Steel Co., Granite City, Ill., helps out in the special mill nursery set up to care for children while their parents attend the company's "Family Days Open House" celebration on June 14 and 15.

## Brazil's Volta Redonda Mill Plans Big Boost in Steel Output

**Rio de Janeiro**—Rolled steel production this year of Volta Redonda, Brazil's 3-year-old steel mill, will reach 308,000 metric tons, announced the board of directors of the National Steel Co., which operates the mill.

In a stockholders report the plant reported that in 1949 rolled steel output was 226,887 metric tons, including rails and accessories, 38,812 metric tons; bars and profiles, 29,668; heavy plates, 33,605; thin hot plates, 37,079; thin cold plates, 54,990; galvanized sheets, 11,237; and tin plates, 20,496.

### Domestic Market Grows

From National Steel mines operated by Volta Redonda came 280,683 tons of coal; 290,550 tons of ore, and 47,471 tons of lime.

Growth of the domestic market for Volta Redonda products has grown impressively, said the stockholders report in a percentage breakdown of sales. Only 2.4 pct was exported. Brazil industries buy Volta Redonda raw materials and have been stimulated by a reliable source of steel in the country, the report stated.

The mill sells mostly rails and railway material directly to the government and it is planned this year to more than double the 1949 rail output.

## U. S. Steel Products Co. Slated for Plant Improvement

**Sharon, Pa.**—An improvement program involving the construction of five new buildings and streamlining of operations will soon get underway at the Sharon plant of U. S. Steel Products Co., according to James A. Connelly, vice-president and general manager.

Included in the program are a steel storage warehouse, a new building to house press equipment, a paint storage building, relocation of stainless steel production facilities in a fourth new unit, and

better personal facilities for 400 employees. Completion is scheduled before the year's end.

The plant manufactures steel containers for the oil, chemical, food, drug, and other industries. Deliveries are made to customers in 16 eastern and southern states on most products and country-wide on stainless steel containers.

## Coal Burners Bowing Out On Pittsburgh Rails and Rivers

**Diesels nearly double steamer tonnage since introduced 39 years ago.**

**Pittsburgh**—The smoke-belching stern-wheelers, once familiar on Pittsburgh's three rivers, are giving way to the more efficient and less smokey diesels, which first appeared here 39 years ago.

This is emphasized by the Dravo Corp., the shipbuilding firm on Neville Island, which is building five new diesel towboats to push coal barges on the Monongahela and Ohio Rivers.

Two of these are for Pittsburgh Consolidation Coal Co., which would naturally tend to continue using coal-burners as long as possible. The other diesels will be used by Jones & Laughlin Steel Corp., and Crucible Steel Co. Pittsburgh's smoke control program was an important influence.

### Same on RR's

A recent survey showed that there are 104 diesels in use on Pittsburgh's rivers, compared to 38 coal-burning steamboats, and a combined total of 29 for gasoline, electric, and oil-burners. The coal-burners have gradually been giving way since 1920, when 40 diesels were built as against only 21 steam and gasoline craft. Today, diesels represent a gross tonnage of 20,986, compared to 11,456 for coal-burners.

The story is similar in regard to steam locomotives versus diesel engines. On Oct. 1, 1946, when smoke control went into effect, there were only 29 diesels in Pittsburgh and Allegheny County. Today there are at least 481, and the old "Iron Horse" has all but bowed out.

## Gas as Power Gains with Alcoa Texas Works

**Port Lavaca plant uses gas for low cost power . . . Generators driven by internal combustion engines produce electricity . . . First aluminum for Texas—By Gene Beaudet.**

**Point Comfort, Tex.**—Although natural gas had long lagged behind coal and oil as a source of power, it has recently been gaining by leaps and bounds. Of course, its widespread use as a fuel had to await pipelines to carry it where it could be useful.

But there are three other big reasons for its growing use: (1) It presents no storage problem; all a consumer has to do is open a valve and the fuel is delivered. (2) It is clean; there is no waste to dispose of after it is used, and when properly regulated

it leaves no soot or smoke. (3) Where available, it is the cheapest of the three principal fuels.

### Gas for Low Cost Power

The Aluminum Corp. of America had these facts in mind when it started construction of its Point Comfort aluminum reduction works near Port Lavaca, Tex., in August, 1948. The low cost power needed to make aluminum is obtained by means of generators driven by internal combustion engines using natural gas as fuel.

The Lavaca Pipe Line Co. was set up by Alcoa to operate pipe lines bringing gas to the works from wells located ashore and in the nearby Matagorda Bay. Daily fuel requirements for the works average 30 million cu ft.

### First Texas Aluminum

In February of this year, the plant was completed and the first aluminum ever made in Texas was poured into ingots. Included in the 25 plant buildings covering approximately 18½ acres of floor space are three pot lines, three engine rooms for production of electric power, a carbon plant and other facilities. Plant buildings are covered with aluminum corrugated roofing and siding, fastened to the buildings by steel welding. This is the largest application of this kind of covering to date.

### Gas to Electricity

Natural gas is delivered from wells at around 400 to 500 lb/sq in. and is reduced in two stages to 60 lb. Regulators at each engine further reduce the pressure to about 6 lb per sq in. for actual operation.

Engines under load consume about 13,000 cu ft per hr. They are of the 2 cycle, 11 cylinder,

### Going Places

**Point Comfort, Tex.**—During the early 1920's the country's yearly consumption of natural gas was a modest 800 billion cu ft. Lack of proper transportation facilities confined its use to a radius of about 300 miles surrounding the oil fields from which it was produced. However, toward the end of the decade the development of welded steel pipe and seamless pipe made it practical to pump natural gas over long distances at high pressures.

The industry started to go places. By 1930 consumption jumped to 1.9 trillion cu ft, in 1940 it reached 2.8 trillion and in 1947 rose to 4.4 trillion. It's estimated that in 1952 the nation's network of natural gas pipelines will total approximately 260,000 miles. They will be able to deliver about 9 trillion cu ft per year.

About 12 million domestic and industrial consumers now use natural gas for over 20,000 different applications. Industry consumes over half the natural gas produced.

radial type built by Nordberg Mfg. Co., Milwaukee. Under normal conditions they operate at 360 rpm and produce 1600 hp. Thermal efficiency is about 30 pct. Electric generators are joined to the engines by direct coupling.

#### Pigs Shipped Out

Gas is converted into electric energy by 120 such engine-generator units, housed 40 each in three engine rooms, one for every pot-line. Generator units are located in the lower level of power houses directly beneath the engines to which they are directly coupled.

Each engine generator unit, operating independently, has its own control panel and auxiliaries. Under normal operating conditions 2,750,000 kw hr can be generated per day.

Current generated by the powerhouses is led off to the pot lines where it is used to reduce aluminum from aluminum oxide by the electrolytic process. Although there is nothing radically new or different in the reduction process at Point

Comfort, it has a fair-sized capacity of 114 million lb per year.

Aluminum in the form of pigs is shipped to Alcoa fabricating plants in various parts of the country where it is made into semifinished and finished aluminum products. Alcoa's new fabricating plant in Davenport, Ia., is expected to be a big outlet for Point Comfort aluminum pigs when barge shipments are made along the Inland Waterway. At present, Point Comfort shipments come into Davenport by rail.

#### Get \$2,900,000 Army Orders

Washington — Eight new Army contracts for the supply of automotive spare parts have been awarded totaling more than \$2.9 million. Receiving the orders were: B. F. Goodrich Co., Oil Gear Co. of Milwaukee, Willys-Overland Co., Chrysler Corp., Timken Roller Bearing Co., Northwestern Auto Parts Co. of Minneapolis (2), and Austin Metal Products of Detroit.

#### U. S. Suppliers to Send Railway Equipment to Brazil

Washington — Financing arrangements for \$10,843,000 worth of railway equipment for the Paulista Railway of Brazil has been announced by the Export-Import Bank. United States suppliers of the equipment will finance \$2,025,900 of the amount.

Included in the orders are 48 passenger cars from the Pullman-Standard Car Export Corp., 5 large electric freight locomotives from the International General Electric Co., 12 diesel-electric locomotives, jointly, from the International General Electric Co., and the American Locomotive Export Corp., and traffic control equipment from the Union Switch & Signal Co. Smaller orders will be filled by various suppliers.

#### To Market New Wheel Truer

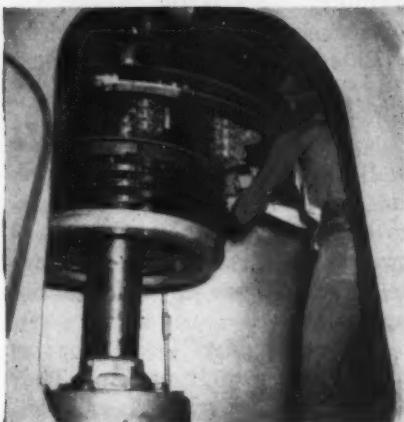
Chicago — A machine for restoring worn out locomotive wheels to proper contour without removing them from the locomotive is being readied for marketing by the Standard Railway Equipment Mfg. Co. Known as the "Standard Wheel Truing Machine," it has been under development for the last 4 years.

#### Army Contracts Given

Washington — The Corps of Engineers has ordered 83 trailers, costing \$229,908, from the Pressed Steel Car Co. (C. R. Jahn Div.), Mt. Vernon, Ill., and the Transportation Corps has awarded a contract to Newport News Shipbuilding & Drydock for construction of ten 585-ton steel cargo barges valued at \$406,250.

#### Forms New Seal Subsidiary

Chicago — The Chicago Belting Co. has announced the formation of a new subsidiary, the Allis Seal Corp., which will produce fluid, grease, and dust seals. Frederick E. Barth is executive vice-president and will be assisted by Rexton S. Rainey, vice-president in charge of engineering.



**GAS BECOMES POWER:** Piped into internal combustion engines, natural gas is transformed into electricity. The upper picture shows one of three engine rooms, each containing 40 engines. Generators are located on the lower floor inside engine bases. Picture at left shows a 1000 kw, 667 v, dc generator.

## U. S. Steel Export Co. Adds Export Base Price Revisions

New York—Effective with shipments from producing mills June 28, 1950, the U. S. Steel Export Co. has added the following revisions in export base prices. Freight is included to New York, Philadelphia, and Baltimore and all sales are subject to seller's established conditions of sale.

Prices are net cash, subject to adjustment to seller's price in effect at time of shipment from the mill and to seller's current list of extras and deductions.

### Base Discounts

American Standard Pipe, T & C	
Buttweld, 2½ in. and 3 in.	
Black	42.4
Galvanized	24.4
Seamless, 3½ in. to 6 in.	
Black	35.4
Galvanized	16.9
English Gas Tubes, T & C	
Buttweld, 2½ in. and 3 in.	
Black	41.3
Galvanized	26.3

## Canada Convention Scheduled

Toronto—A joint summer convention of the Engineering Institute of Canada and the American Society of Civil Engineers will be held in the Royal York Hotel here from July 12 to 14. Air transport, construction, highways, surveying, and mapping are some of the topics slated for discussion.

## Opposes Aluminum Tariff Hike

Washington—Aluminum Import Corp. of New York has filed a statement with the Tariff Commission in opposition to any increase in present import tariff rates. Both Reynolds Metals Co. and Kaiser Aluminum & Chemical Corp. recently filed applications seeking an increase under the escape clause tariff procedure.

## Plan Galvanizing Meeting

London—Sponsored by the Hot Dip Galvanizers Assn., an international conference on hot dip galvanizing will be held at Copenhagen from July 17 to 20. Technical papers will be presented and the future prospects of hot dip galvanizing will be discussed.

## INDUSTRIAL SHORTS

CENTENNIAL — RICHARD DUDGEON, INC., manufacturer of hydraulic machinery, is celebrating its one hundredth anniversary this year. The firm moved last week from its 90-year old plant in New York City to 789 Bergen St. in Brooklyn.

**\$6½ MILLION BUILDING** — Preliminary site preparation work was recently started on a new \$6½ million motor truck engineering and laboratory building for the INTERNATIONAL HARVESTER CO. at Fort Wayne, Ind. The structure will be located on a 25-acre tract of land directly opposite the east entrance of the company's motor truck plant.

**OPEN HOUSE** — A new \$50,000 warehouse of the CARPENTER STEEL CO. at 3811 Pacific Ave. in Cincinnati was the scene of an open house celebration held recently. Several hundred customers attended.

**SELLS PLANT** — Clark Equipment Co., Buchanan, Mich., has sold its Berrien Springs, Mich., plant to YALE & TOWNE MFG. CO. Yale & Towne will move its door closer and lock division from Chicago to the new plant.

**NONFERROUS BROKER** — Guy P. Norton has formed his own company under the name of GUY P. NORTON, INC., at 111 West Main St., Waterbury, Conn. The company will do a brokerage business in nonferrous metals.

**AUCTION SALE** — A public auction sale of some \$8 million worth of surplus materials will be held at the NAVAL SUPPLY DEPOT, Mechanicsburg, Pa., from July 19 to 21. The sale includes a large variety of machine tool parts, diesel engine parts, 243 tons of aluminum and iron scrap, varied lots of elbows, valves and pipe, and aviation structural parts.

**SEEKS U. S. CONTACTS** — It has been reported that G. H. COOK & SONS, LTD., operators of bauxite mines in the Central Provinces of India and exporters of bauxite, are interested in contacting American firms which may be contemplating participation in the Indian manganese and iron ore mining industry.

**NEW EQUIPMENT** — The latest equipment for washing blast furnace gas will be installed at the Donora, Pa., steel works of the AMERICAN STEEL & WIRE CO. The new unit will replace the present equipment for reclaiming fine iron ore dust which is present in the gas taken off from the top of the plant's two blast furnaces.

**GROUP OFFICERS** — Ralph T. Rycroft, vice-president, Ken-croft Malleable Co., Inc., Buffalo, has been elected president of the MALLEABLE FOUNDERS' SOCIETY. Cal C. Chambers, president, Texas Foundries, Inc., Lufkin, Tex., was named vice-president.

**BIDS OPEN** — Bids to be opened July 17 have been asked by the ORDNANCE DEPT., Springfield, Mass., for the supply of barrel blanks as follows: 141,105 special chrome - molybdenum steel, 31,515 openhearth melted, and 9389 chromium-molybdenum-vanadium.

**TAKES OVER** — The coke plant of the Laclede Gas Light Co. in St. Louis has been purchased by the GREAT LAKES CARBON CORP. Frederick G. Poeter and Ralph H. Stover have been temporarily transferred to St. Louis to integrate the new plant with the Great Lakes Carbon organization.

**CANADIAN AGENT** — Tube Turns, Inc., Louisville, has appointed THOMAS ROBERTSON & CO., LTD., of Montreal as a distributor of their welding fittings and flanges. The company will also represent Tube Turns of Canada, Ltd.

## Canada Turns to U. K. For Needed Steel

**Demand for rolled steel products soars . . . British steel replaces reduced American imports . . . Shortages to continue . . . Prohibited U. S. consumer goods to go on import quota.**

**Toronto**—Canadian demand for rolled steel products has been tightening steadily in recent weeks and shortages are becoming critical on some materials. In former years, demands unfilled by Canadian mills were filled by United States imports, but this has changed.

### No Drop In Demand

Steel imports from the States have dropped off due to the difficulty in obtaining materials there and also as a result of the lower prices of European producers following currency devaluation.

Substantially increased steel imports from the United Kingdom have enabled Canadian consumers to continue on an operating basis and have played an important part in relieving pressure for rolled steel products on domestic mills. British steels are replacing some materials formerly acquired from the States.

Canadian mills are maintaining virtual capacity production and

heads of Ontario companies can see no slackening in demand this year. In the Hamilton area mills are booked on such items as carbon steel bars, black and galvanized sheets, and plate into October and inquiries continue to appear.

On the other hand, wire and nails have eased and no shortages are reported. But on most rolled products delivery dates are being extended.

There has been a fresh surge of consumer buying recently which seems to result from a fear of a more critical shortage as the year advances. In some lines slow delivery has resulted in minor curtailment of industrial plant operations.

### To Permit U.S. Imports

While Canadian mill representatives are making no complaints regarding increased imports from the United Kingdom, they are a bit concerned as to what this will mean in future years when demand slackens. At the moment

there are no indications of slackening in steel demand although there has been some slowing in sales of finished consumer goods.

Starting in July, there will be freer importation of such items as refrigerators, washing machines, clothes wringers, outboard motors, radios and chassis, phonographs, etc., from the United States. These items, formerly on the prohibited list, will go on a quota.

While steel scrap prices in Canada have had two jumps in price since the middle of April, for a total rise of \$6.00 per ton, and the pig iron price has been upped \$2.00 per ton, finished steel prices are unchanged.

### Approve Recapitalization Plan

**Pittsburgh**—Directors of Pittsburgh Steel Co. have approved a voluntary plan of recapitalization designed, according to Joseph H. Carter, chairman, "to simplify the capital structure of the company."

Mr. Carter also said the program will be a major step toward elimination of dividends in arrears on the Class A 5 pct preferred stock. These arrearages at the end of last year amounted to \$50.625 per share.

### Launches Chemical Production

**Ashtabula, Ohio**—Production has been launched at the new plant of the National Distillers Chemical Corp. and the first shipment of metallic sodium went out on June 20.

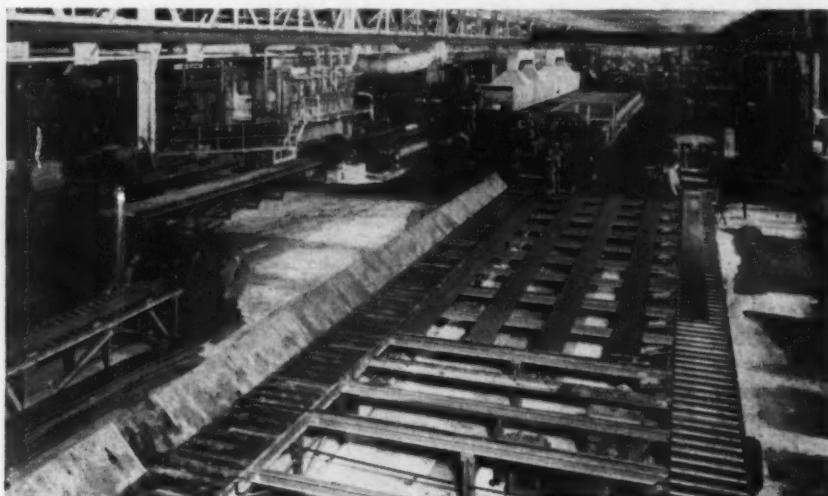
### To Install Improved Equipment

**Donora, Pa.**—American Steel & Wire Co. will install new and improved gas washing equipment on the two blast furnaces at its steel works here. The project will be completed early next year.

### ASTE Chapter Tours New York

**New York**—The Cleveland chapter of the American Society of Tool Engineers spent the Fourth of July holiday on a 4-day tour of this city.

**NEW INSTALLATIONS:** Re-equipping of the American Brass plant in Buffalo includes this continuous hot breakdown equipment. The project, to be completed in September, will see installation of new conveyor equipment, three annealing furnaces, two 4-high mills, a continuous annealing and pickling unit, four slitters, and a Sendzimir mill to operate at speeds up to 1000 fpm.



## PEI Lists Dates of Its Three Highlight Annual Events

Washington—Details and dates of the three highlight events of the Porcelain Enamel Institute were announced recently.

Its twelfth annual Shop Practices Forum will be held on Sept. 13 to 15 in the University of Illinois, Urbana, Ill. Technique discussions will feature the industry-wide meeting.

The fourth annual Sales and Management Conference will be staged in the Hotel Cleveland, Cleveland, on Oct. 5 to 6, and officers will be elected at the nineteenth annual meeting, set for Nov. 1 and 2 in the Greenbrier Hotel, White Sulphur Springs, W. Va.

Further information may be obtained from PEI headquarters, at 1010 Vermont Ave., N. W., Washington 5, D. C.

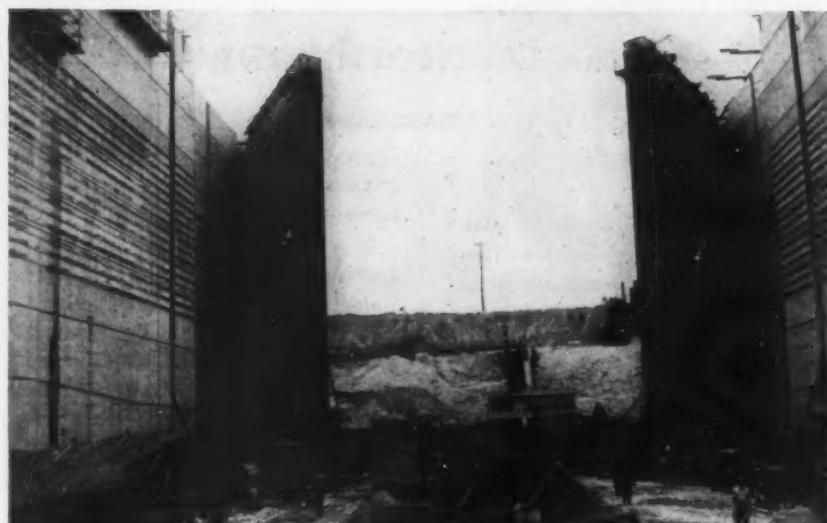
### Shale Oil Costs Drop

St. Louis—Mining costs have dropped to 29¢ per ton of shale with recent mechanization at the U. S. Bureau of Mines oil-shale mine near Rifle, Colo., the American Society of Mechanical Engineers recent conference was told by E. D. Gardner, chief mining engineer, Bureau of Mines, and E. M. Siprelle, chief of the Oil Shale Mine Branch.

It was brought out that the cost of producing crude shale oil from 30 gal per ton shale would be about \$1.50 per bbl, a drop from the \$2.00 figure of a year ago. With the sharp rise in petroleum crude and technological advances in mining and processing shale oil, the price of petroleum fuels and oil shale fuels was reaching the same level, it was reported.

### GE to Show Midget Locomotive At Utah Metal Mining Exposition

New York—Built to shuttle ore cars through low-ceilinged tunnels, a 1½-ton storage-battery trammer locomotive 6 ft long and 38 in. high will be exhibited in the General Electric display at the Metal Mining Exposition of



STUDY IN BIGNESS: Final touches are being put on these gates at the downstream end of the main lock of Locks No. 27 near St. Louis by workmen of the American Bridge Co., subsidiary of U. S. Steel. The gates are 72 ft high and it is 92 ft from grade level to the top of miter gates and lock walls.

the American Congress scheduled for the State Fair Grounds, Salt Lake City, Utah, on Aug. 28 to 31.

Also on exhibition will be a transparent plastic 10-hp Tri-Clad pump motor equipped with a time delay switch and a new design

magnetic starter. The GE two-shoe magnetic dc brake which won the Eleventh Annual Electrical Manufacturing Product Design Award of 1949 for excellence in design and engineering will be another of many displays.

## Player Piano Principal Plays Industrial Tune

**Arma Corp. announces "Armomatic" to operate machine tools automatically . . . Blueprint data recorded on paper rolls . . . Operators need not read blueprints or even know how.**

New York—Adaptation of the old player piano principle to automatic control of machine tools has been accomplished by the Arma Corp. with a new "Armomatic" device announced last week.

### Automatic Inspection, Too

Utilizing seven basic mechanical and electrical units of the type developed by Arma for military control and computing equipment, the device operates the machine tool controls through servo-motors, guided by blueprint data recorded on paper rolls in the form of rows of punched holes.

The device can be applied to the controls of almost any machine tool, according to Arma engineers. Automatic inspection can be in-

cluded as part of the equipment.

Arma demonstrated a model which cost about \$1,500, operating the feed controls on a simple lathe. An operator was required only to load and unload the workpieces. Time savings claimed were as much as 75 pct over normal production time on the machine.

Among the advantages of the Armomatic control is the fact that machine tool operators need not take time to read blueprints, nor even know how to read blueprints. Human errors in machine operation are eliminated. One operator can often take care of several machines. Ease of change-over from one cycle to another is stressed by Arma engineers.

**Viewing the News from**

**The ECONOMIC SIDE**

By JOSEPH STAGG LAWRENCE

**"Showdown"**

LIKE an earlier conqueror, Stalin may have crossed his Tiber. The eruption of Communist armed forces across the Thirty-eighth Parallel in Korea may be the gage of battle which opens the Third World War.

This is still a moot question. It would be fatuous to ignore the possibility that the first shots in a major violent conflict between the East and the West have already been fired.

If this is the case, it represents a revolution in Communist tactics and a radical change in the character of the man who rules the Kremlin. While the Communists have not been averse to the use of force in the promotion of their purposes, they have always resorted to it only after all nonconventional means have failed.

Viewing all points of contact and exposure throughout the world, it can hardly be said that the cold war tactics of the Kremlin in the post-war period have failed. Although the Reds may have been rebuffed in Greece and Iran and Berlin, there is no denying that they have made substantial and alarming headway elsewhere.

The leader of the Politburo is noted for his caution no less than for his ruthlessness. It has always been his policy to reach for something without committing himself or his country to the danger of defeat. It is for this reason that the Kremlin has unleashed the naked sword of violence only when it could be wielded by some third party. This was true in Spain. It was the underlying principle of the deal with Hitler. It has been most recently demonstrated in the conquest of China.

The great virtue of this tactic is that it permits withdrawal when the going gets rough without loss of face. Even defeat can be sustained without a fatal loss of prestige or

physical danger to the boys in the Kremlin.

It is possible, therefore, that the firm action of this country and the United Nations in openly opposing, with the strong sanction of armed force, the invasion of Korea may prove a salutary showdown with the Soviets. Unless they have changed their character, this show of strength, carrying with it the possibility of open warfare on an international scale, is precisely the kind of deterrent which the aspirations of the Russians require at this point. In other words the action of the American government is more likely to halt communist aggression in Korea than to provoke another World War.

This is unquestionably the reaction of the financial and business community. The unequivocal position taken by the President is almost universally applauded as the proper procedure in the crisis. It serves to clear the air. It places a period upon the uncertainty which Red tactics have created in the post-war world.

Formidable and dangerous as the possibility of another great world war may be, the American public would rather have the certainty of a perilous status than the uncertainty of an ambiguous no-man's area in international diplomacy. This marks the end of that myopic policy of containment under which the geographic bucket of Bolshevism is plugged on one side, the West, and left full of holes in the East. If this fluid foe is to be contained, all the leaks must be plugged.

The statement of the President, the action of the United Nations, the commitment of American men and materiel serve notice upon the Kremlin that the device of puppet governments can no longer conceal the real foe, that henceforth attempted conquest via stooges entails real and inescapable risks.

**Warehouse Shipments Tabulated**

Cleveland—Steel products shipments to warehouses as compared with total mill shipments have been stepped up consistently, reaching 17.58 pct of a 58,104,010 total in 1949 from 10.52 pct in 1926, it is shown in a recently-published tabulation of total mill and warehouse shipments from 1926 to 1949.

Published by the American Steel Warehouse Assn., Inc., 442 Terminal Tower, this city, the booklet covers a wide range of steel products, from structurals to oil country goods. It reveals that 1946 was the record year for warehouse shipments, 19.07 pct of a 48,775,532 total. Booklets will be sent on request.

**Southern RR's to Get 250 Cars**

Birmingham—An order for \$1,650,000 worth of all-steel covered-hopper railroad cars has been placed with the Pullman-Standard Car Co. here. The order is from members of the Southern Railway System and includes the New Orleans and Northeastern; Georgia, Southeastern & Florida; and the Alabama Great Southern.

The order consists of 200 standard size cars of 1958-cu ft capacity and 50 more of extra large size containing 3190 cu ft.

**Bid for Office Building**

Birmingham—Sloss-Sheffield Steel & Iron Co. will build a new office building. Bids are being received for a two-story brick and steel structure with 27,000 sq ft of floor space at a cost of \$300,000. The contract is expected to be awarded this month.

**Pullman-Standard Pension**

Birmingham—Pullman-Standard Manufacturing Co. has reached a settlement with the United Steelworkers of America which covers a new pension and insurance program for its employes at the Bessemer, Ala., Chicago, Hammond, Worcester, and Butler plants.

## New Skills for New Industry in Puerto Rico

**School of Industrial Arts trains 3500 at a clip to man industries attracted to Island . . . School has \$20 million in equipment . . . Offers 50 courses to unskilled workers.**

**San Juan**—As green to the world of lathe and press as the fields from which they came, 3500 Puerto Rican students in the School of Industrial Arts are being equipped with technological skills to bolster the country's expanding industrialization program which has drawn 77 new industries to Puerto Rico since 1942.

So enticing are the job offers of young industry desperate for skilled men that the school must convince its students to remain until graduation. Situated on 30 acres at Rio Piedras, near San Juan, the vocational training school already has \$20 million worth of equipment in its 14 buildings. It offers 50 courses to neophyte technicians, mechanics, and construction men.

About 90 pct of the students are former service men studying under the G.I. Bill of Rights. They are the chosen few, having passed comprehensive physical and men-

tal exams. They pay a basic fee of \$30 per month for instruction, lab fees, and materials. Post graduate courses lead to a BS degree in Industrial Arts.

### Orders for Workers

The school's fame has spread throughout the country and applicants have swarmed to the registration office—22,000 are awaiting admission, many from other Caribbean islands. Neighboring countries supplement demand for Industrial Arts' alumni. Colombia has ordered 1000 mechanics and 1500 construction foremen. Costa Rica seeks airplane mechanics.

A large part of the school's equipment is concentrated in its machine shop, obtained without cost from the U. S. War Assets Administration. The school was organized as part of the University of Puerto Rico and is now on a self-supporting basis.

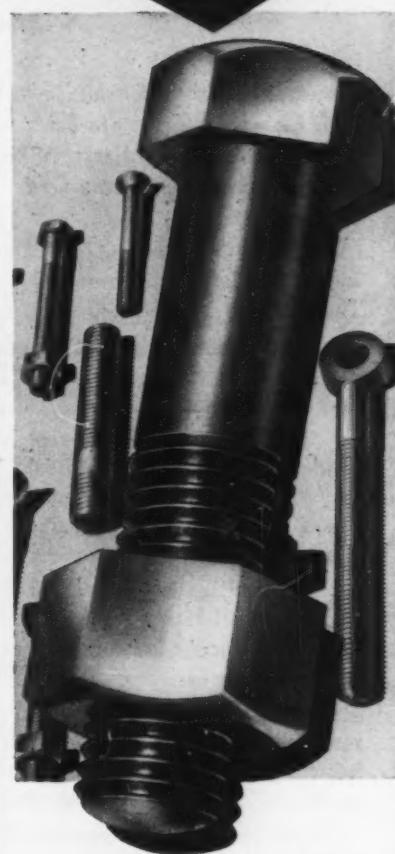
Director Eloy Rodriguez Cha-

**NEW HORIZONS:** Former field workers of Puerto Rico are trained in the well-equipped machine shop at the School of Industrial Arts. Machinery is painted blue and green for a minimum of eye strain while low-hanging beams and other structural hazards are painted yellow.



July 6, 1950

First for  
**BOLTS** ←  
**NUTS**  
**STUDS**



★ Carbon Steel      ★ Stainless Steel  
★ Heat-treated      ★ Silicon Bronze  
Alloy Steels      ★ Naval Brass  
★ Monel Metal

You can count on a uniform Class 3 Fit when you buy Pawtucket threaded fasteners. Accurately made in standard dimensions—or to your specifications.

**BETTER BOLTS SINCE 1882**

**Use Headed and Threaded Fasteners for Economy and Reliability**

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"THE BOLT MAN"  
MANUFACTURING COMPANY  
327 Pine Street • Pawtucket, R. I.  
THE PLACE TO SOLVE YOUR BOLT PROBLEMS  
T.M. REG.

115

# Briefs on barrel finishing

## Technical Service Department

WYANDOTTE CHEMICALS CORPORATION

**Summary:** *Barrel finishing offers manufacturers an economical method of finishing small parts in bulk. Steel balls or shapes produce a smooth lustrous finish. Stones remove excess metal, as well. Improvements in technique are widening the field.*

Barrel finishing consists of rotating the work in a barrel together with a burnishing medium and a solution of the burnishing compound. The parts are handled in large quantities and the labor cost per part is low.

The method is especially suited to very small parts. The work is easier to clean than buffed work. It is possible to form definite radii and micro-inch surface finishes. It can produce mirror finishes.

Two media are used: steel balls or stones. Steel balls are used to produce a smooth lustrous finish. They remove almost no metal. Rather, they "iron out" the surface by the rolling and sliding burnishing shapes. Stones, on the other hand, remove excess metal in addition to producing a smooth finish.

The burnishing compound serves as a lubricant between the parts and the burnishing medium and between the parts themselves. In this manner, a smooth finish is obtained, whereas, in its absence, seizure and scratching are easily possible.

Often, the burnishing compound contains a brightening agent to remove metal oxides and yield a true metallic color. Lastly, the burnishing compound should have sufficient detergent action to remove traces of oil and other contaminants from the parts.

The burnishing compound should be selected with care. It should suit both the work and the media. Wyandotte products for this use include: Light Alloy No. 1 Cleaner, Burnishing Compounds 317, 321 and 322, Burnishing Powder and Neosuds\*.

By far the greater percentage of small parts can be finished in a barrel with few problems. As the parts become larger and more complex the difficulties do increase. But with ingenuity more and more types of work now considered too difficult or uneconomical will yield to improved techniques of barrel finishing. If you have a problem write us.

\*Reg. U. S. Pat. Off.



**THE WYANDOTTE LINE** — products for burnishing and burring, vat, electro, steam gun, washing machine and emulsion cleaning (soak or washing machine), acid pickling, related surface treatments and spray booth compounds. An all-purpose floor absorbent: Zorball—in fact, specialized products for every cleaning need.

WYANDOTTE CHEMICALS CORPORATION  
WYANDOTTE, MICHIGAN  
SERVICE REPRESENTATIVES IN 88 CITIES

 **Wyandotte**  
REG. U. S. PAT. OFF.

bert studied vocational school systems of New York State, California and Detroit and adopted features most applicable to Puerto Rico. A faculty of 170, all but two of which are Puerto Ricans, was trained at a cost of \$200,000.

Initial vocational training instituted in 1930 will be further expanded through a 6-year program of school construction slated for 1955 completion. Three regional schools will go up at Ponce, Mayaguez, and Arecibo. Each will serve 1000 students. Secondary schools to enroll 300 and vocational schools for 200 will also be built.

Shrewd aim of the program is to complement the program that is bringing industry to Puerto Rico—the 12-year tax holiday and government eagerness to be of utmost help to foreign companies. Puerto Rico is steadily gaining industry and it intends to furnish the skilled manpower.

## Automotive Shipments Drop

Washington—Exports of trucks, buses and parts for replacement for the first 4 months of 1950 dropped sharply from the quantity shipped during the same period last year, reports the Commerce Dept. Replacement parts shipments abroad dropped by 23 pct for the same 4 months.

Parts for assembly rose from \$33 million to \$44 million. Truck and bus exports through April totaled 33,930 units against 59,796 last year; passenger cars, 29,736 against 55,228 units; and replacement parts, \$42 million for 1950 as compared with \$62 million through April last year.

## Catalin Plant Opens Operations

New York—The new Calumet City, Ill., plant of the Catalin Corp. of America, producers of plastic core baking resins, is now operating. The site includes dock and railroad siding facilities. In addition to urea formaldehyde, core baking resins, the new plant will produce Urea, Phenolic, Melamine, and Resorcinol resin formulations.

# NEW ELWELL-PARKER Fork Truck

OFFERS YOU MORE  
PER TRUCK DOLLAR  
INVESTED!

Advanced Design Features  
Plus Built-In Quality  
Insure Top Performance

**EASY TO OPERATE**—Simplified automotive-type controls. Foot accelerator pedal. Padded, form-fitting seat and back rest are adjustable. Entry or exit from either side. Maximum vision. Hydraulic brakes.

**FINEST MOTOR**—Elwell-Parker Class B motors have costly glass and asbestos insulation that makes them practically indestructible and fire-proof. Double sets of brushes. Bearings grease packed for over 5 years service.

**"TANK-TOUGH" CONSTRUCTION**—The heavy-gauge welded frames are fully reinforced. Strong Y-center sill assures permanent alignment. More alloy steel and drop forgings than in the average truck.

**GREATER LIFT**—Total lift is 130" with initial lift of 66".

**AMPLE TILTING ANGLE**—5° forward and 12° backward for greater load stability turning corners.

**FASTER LIFT**—25 f.p.m. with full load; 42 f.p.m. without load.

**LOW HYDRAULIC PRESSURE**—less than 1000 p.s.i. in cylinders reduces leakage liability.

**CUSHION TIRES**—give smooth riding, better traction and freedom from punctures.

MODEL F-30T  
Capacity 4000 lbs.  
48" Load



YOU CAN SAVE MORE MONEY THAN EVER BEFORE with this Elwell-Parker! For the rise in price of improved quality E-P trucks over the years is small compared to the greatly increased cost of the labor they free for productive work. And Elwell-Parkers repay their cost over and over because they are built to give 20 years of reliable service! Not cheap in either quality or price, the new F-30T will match the finest machinery in your plant. Its simplified and refined design is the product of Elwell-Parker's greater experience and research in this field. The F-30T is truly the truck for those who want the finest! The Elwell-Parker Electric Company, 4073 St. Clair Avenue, Cleveland 3, Ohio.

Write for Illustrated Folder and Specifications.

## ELWELL-PARKER POWER INDUSTRIAL TRUCKS

Established 1893

### House Approves Copper Bill

Washington—A stopgap bill to maintain imports of copper by extending suspension of import duties through Aug. 31 was approved unanimously last week by the House and similar action by the Senate was awaited.

Introducing the bill, Rep. James D. Patterson, R. Conn., said that the nation's copper supply must not be endangered in view of the Korean crisis. A public hearing on bills to extend suspension through June 30, 1952, will be held by the House Ways and Means Committee on July 10.

### Separates Aircraft Bearings

New York—In a move to insure meeting the precise specification requirements for aircraft anti-friction bearings, SKF Industries,

Inc., has placed these bearings under special separate manufacturing supervision. These precision bearings are primarily for jet power plants.

### Asks Steel Rate War Probe

Washington—A probe into what he described as a rate war between rails and truckers for steel transportation business was urged by J. J. Kuhner, secretary of the Assn. of Highway Steel Transporters, last week, before a Senate investigating sub-committee.

He asked Congress to require the Interstate Commerce Commission to investigate alleged rate cutting by railroads that was forcing truckers to retaliate with lower rates. Result of the rate war, he said, might be a state where neither makes money.

### May Iron & Steel Production by Districts

As Reported to American Iron & Steel Institute

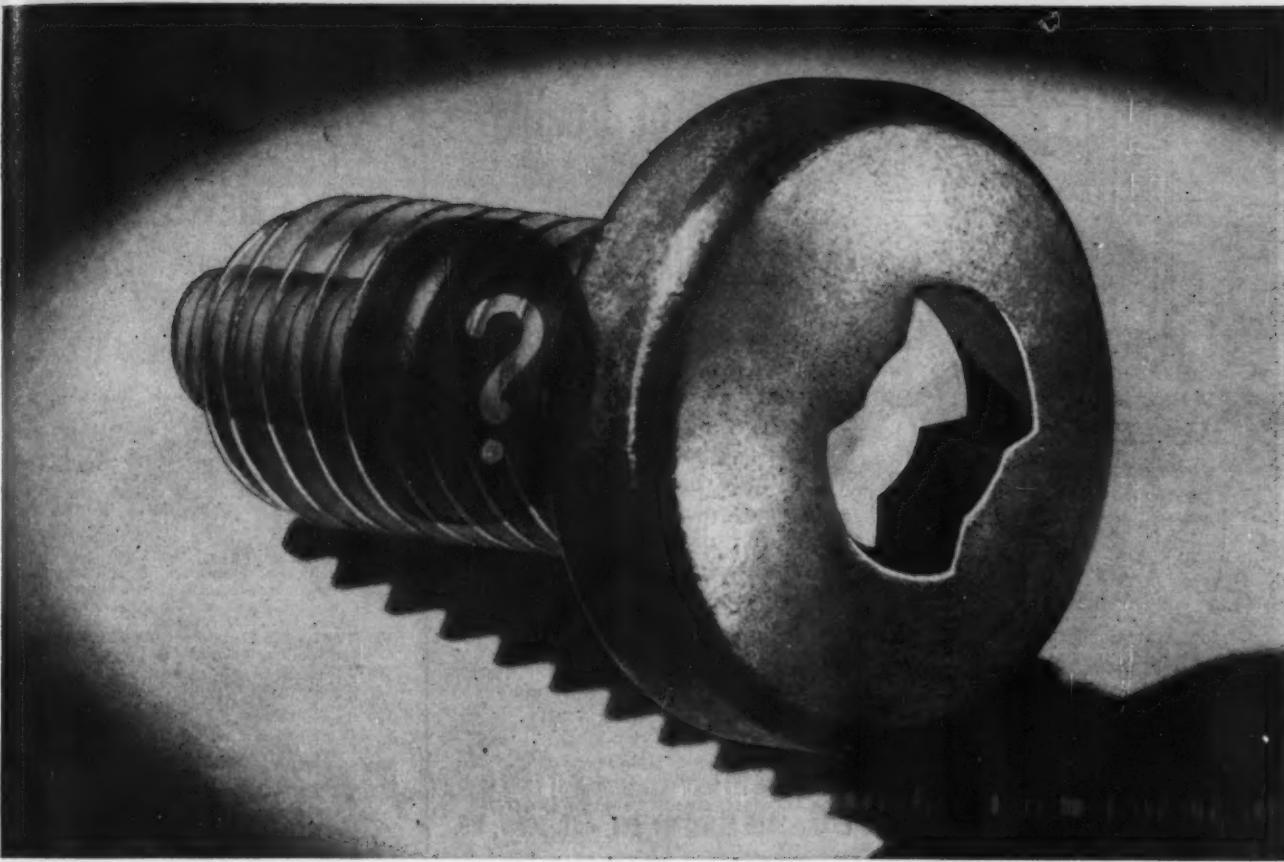
BLAST FURNACE CAPACITY AND PRODUCTION —NET TONS	Number of Companies	Annual Blast Furnace Capacity	PRODUCTION								
			PIG IRON		FERRO- MANGANESE AND SPIEGEL		TOTAL		Pct of Capacity		
			May	1950 to Date	May	1950 to Date	May	1950 to Date	May	1950 to Date	
<b>Distribution by Districts:</b>											
Eastern.....	12	13,353,580	1,145,023	4,825,969	23,021	127,519	1,168,044	4,953,488	103.0	89.6	
Pitts.-Youngn.....	16	26,735,520	2,142,514	9,450,850	22,998	95,596	2,165,512	9,546,446	95.3	86.3	
Cleve.-Detroit.....	6	7,044,600	618,789	2,805,626			618,769	2,805,628	103.4	96.2	
Chicago.....	7	15,897,190	1,205,705	5,200,410			1,205,705	5,290,410	89.3	80.4	
Southern.....	8	5,141,250	443,494	1,928,151	12,286	40,380	455,780	1,966,541	104.3	92.4	
Western.....	4	3,325,400	241,538	837,475			241,538	937,475	85.5	68.1	
Total.....	38	71,497,540	5,797,043	25,236,463	58,305	263,505	5,855,348	25,498,988	98.4	86.2	

STEEL CAPACITY AND PRODUCTION —NET TONS	Number of Companies	Annual Steel Capacity	PRODUCTION								
			TOTAL STEEL				Alloy Steel* (Incl. under total steel)		Carbon Ingots-Hot Topped (Incl. under total steel)		
			May	1950 to Date	Pct of Capacity		May	1950 to Date	May	1950 to Date	
					May	1950 to Date			May	1950 to Date	
<b>Distribution by Districts:</b>											
Eastern.....	25	19,875,460	1,858,336	7,481,125	96.2	90.9	105,753	489,222	287,280	1,351,339	
Pitts.-Youngn.....	34	39,145,920	3,364,258	15,094,868	101.2	93.2	434,041	1,916,767	344,080	1,596,064	
Cleve.-Detroit.....	8	9,333,480	807,459	3,855,161	101.8	99.8	48,430	211,621	114,228	534,537	
Chicago.....	15	20,777,520	1,826,623	8,548,511	103.6	99.4	135,361	645,746	252,925	1,198,708	
Southern.....	8	4,560,820	425,740	1,915,014	109.9	101.4	5,765	23,796	6,171	26,049	
Western.....	11	5,699,820	467,471	2,080,533	96.5	88.2	6,369	35,504	7,935	36,499	
Total.....	80	99,392,800	8,551,887	38,975,212	101.3	94.7	735,719	3,322,656	1,012,618	4,743,197	

\* For the purpose of this report, alloy steel includes stainless and any other steel containing one or more of the following elements in the designated amounts: Manganese in excess of 1.65%, and Silicon in excess of 0.60%, and Copper in excess of 0.60%. It also includes steel containing the following elements in any amount specified or known to have been added to obtain a desired alloying effect: Aluminum, Chromium, Cobalt, Columbium, Molybdenum, Nickel, Titanium, Tungsten, Vanadium, Zirconium, and other alloying elements.

Greater Tonnage  
Per Edge of Blade

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SHEAR KNIFE CO.  
HOMESTEAD · PENNSYLVANIA



*Over What Other Screws Does*  
**CLUTCH HEAD STEP-UP PRODUCTION 50%?**  
*Over All Other Type Screws...*

**RECESSED HEADS AS WELL AS SLOTTEDS**

CLUTCH HEAD's modern design meets today's competitive selling problem of how to "Produce More For Less" . . . by effecting time and cost-savings that quicken production steps all the

way down the assembly line. On the basis of experience resulting from changeover from other types of recessed head screws, here is how these users score CLUTCH HEAD supremacy:

**High visibility** of the clutch recess inspires operator confidence for unhesitating faster driving, while dead-center entry with the Center Pivot Column prevents driver canting. Straight driving is automatic . . . hence no burred or chewed-up heads.

**Absence of "ride-out,"** due to CLUTCH HEAD's non-tapered driving engagement, checks out hazard of driver skidding. Freedom from end pressure makes driving effortless, safer and smoother for a stepped-up tempo.

**The Lock-On** to check out fumble spots . . . screw and bit locking as a unit to permit one-handed reaching and driving from any angle.

**The unequalled durability** of the Type "A" Bit with a record of driving 214,000 screws non-stop . . . plus the economy of its repeatable reconditioning in a simple 60-second operation.

**The importance of CLUTCH HEAD's basic design** for common screwdriver operation . . . to simplify adjustments and cure field service "headaches."

These exclusive CLUTCH HEAD advantages are illustrated and detailed in this new Brochure.



Your copy will come to you by mail on request with mention of the types and sizes of screws in which you are interested.

TYPE "A"  
ASSEMBLY BIT



COMMON  
SCREWDRIVER

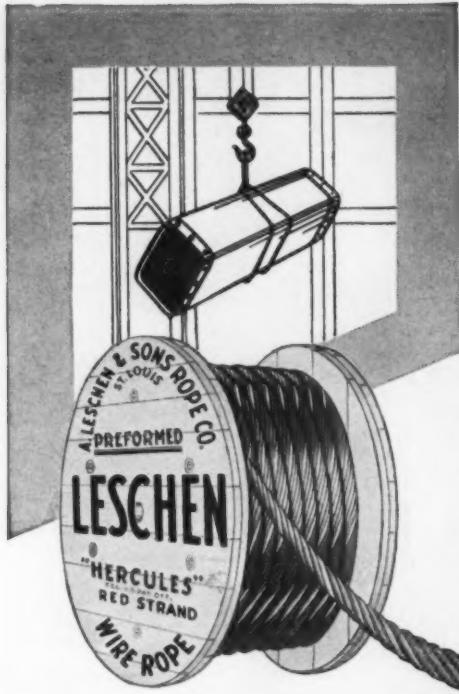


**UNITED SCREW AND BOLT CORPORATION**

CLEVELAND 2

CHICAGO 8

NEW YORK 7



## The Proof of Quality Is in PERFORMANCE

For many years, "HERCULES" (Red-Strand) Wire Rope has been proving its outstanding quality by the accurate yardstick of performance — on all sorts of tough jobs. Such consistent performance is not a matter of chance. Design... rigid tests and inspections... equipment... firm standards — are essential factors.

We invite  
Your  
Inquiries

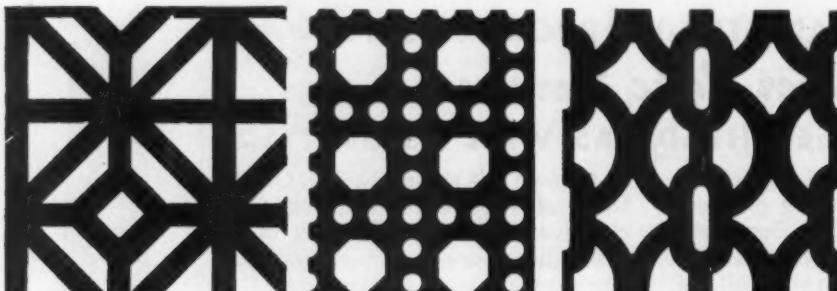
**A. LESCHEN & SONS ROPE CO.** 5909 KENNERLY AVE. • ST. LOUIS, MO.

ESTABLISHED 1857

New York 6  
Chicago 7  
Birmingham 6

Houston 3  
Denver 2  
Los Angeles 21

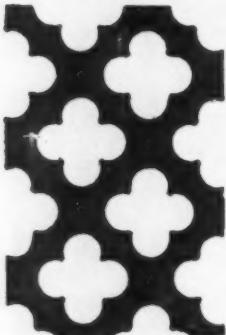
San Francisco 7  
Portland 9  
Seattle 4



### Ornamental perforated metal

Hendrick offers a wide variety of decorative patterns in light weight, perforated metal, for radiator enclosures, stove panels, kitchen cabinets, and similar applications.

Regularly furnished in steel sheets of available stock size, in gauges from 16 to 22. These patterns can also be supplied in other metals on special order. Write for full information.



Perforated Metals  
Perforated Metal Screens  
Architectural Grilles  
Mits Open Steel Flooring,  
"Shur-Site" Treads and  
Armorgrids

**HENDRICK**  
*Manufacturing Company*

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Sales Offices In Principal Cities

### • News of Industry •



## STEEL CONSTRUCTION NEWS

Fabricated steel awards this week included the following:

- 1200 Tons, Harrisburg, Pa., Harrisburg Hospital, Ritter Bros., Harrisburg, low bidder on general contract.
- 500 Tons, Burlington-Mercer Counties, N. J., New Jersey Dept. of Highways, J. F. Chapman & Sons, Hillside, N. J., low bidder on general contract.
- 320 Tons, Farnhurst, Del., Farnhurst Interchange, Delaware State Highway Dept., through Wilson Contracting Co., Wilmington, Del., to Bethlehem Steel Co., Bethlehem.
- 190 Tons, Montgomery County, Tenn., bridge, Continuous Beam Span, Tennessee Highway Department, to Virginia Bridge Company, Birmingham, Ala.
- 180 Tons, Upper Darby, Pa., addition to Lit Bros. store, to Manuel A. Greenberg, Philadelphia.
- 130 Tons, North Adams Mass., steel plate girder bridge and approaches. Awarded to Petricca Construction Co., Pittsfield. George A. Curtis, Pittsfield, district engineer. Completion date Dec. 15, 1950.

Fabricated steel inquiries this week included the following:

- 5350 Tons, Linden, N. J., New Jersey Turnpike Authority, Contract 38, due July 14.
- 3550 Tons, Hudson County, N. J., New Jersey Turnpike Authority, Contract 54, due July 6.
- 1556 Tons, Gloucester-Camden-Burlington Counties, N. J., New Jersey Turnpike Authority, Contract 53, due July 18.
- 1050 Tons, Mercer-Middlesex Counties, N. J., New Jersey Turnpike Authority, Contract 41, due July 12.
- 200 Tons, Woodville, Pa., female senile patients building, General State Authority, due July 7.
- 170 Tons, Lawrence County, Pa., Pennsylvania Turnpike Authority, Section 29a, due July 6.

Reinforcing bar awards this week included the following:

- 1650 Tons, Gloucester-Camden-Burlington Counties, N. J., New Jersey Turnpike Authority, Contract 33(2), to F. A. Canuso & Sons, Philadelphia.
- 1600 Tons, Wilmington, Del., superstructure, Delaware Memorial Bridge, Whiting, Turner & Co., Baltimore, low bidder.
- 1200 Tons, Philadelphia, medical center for University of Pennsylvania, through McCloskey & Co., Philadelphia, to Bethlehem Steel Co., Bethlehem.
- 600 Tons, Philadelphia, maximum security building for Philadelphia State Hospital, through John A. Robbins, Philadelphia, to Bethlehem Steel Co., Bethlehem.
- 400 Tons, Doylestown, Pa., Highschool building, through Wark & Co., Philadelphia, to Bethlehem Steel Co., Bethlehem.

Reinforcing bar inquiries this week included the following:

- 1000 Tons, Bethlehem, sewage treatment plant, due July 14.
- 178 Tons, Allegheny County, Pa., Divided highway consisting of reinforced cement concrete pavement, including reinforced concrete structures; grading and drainage; construction of reinforced cement concrete ramps, including one (1) plate girder bridge and the relocation of a parallel road, including one (1) reinforced concrete structure. Secretary of Highways, Harrisburg, Pa. Bids due July 21.

# The HOUGHTON NEWS

VOL. 18, NO. 3

JULY, 1950

**...the "near editor's" viewpoint**

"Quickies" from a quick trip to France:

Seems to be no immediate prospect of a Communist government in France. "Commies" are a noisy minority, but the average Frenchman is too much of an individualist to be a Communist.

Apparently there is no picketing during strikes in France.

Fashion note: Daytime skirts are short and very tight, belted in at the waist until one wonders how the girls breathe.

Plant of Societe des Produits Houghton in Paris, destroyed by spectacular fire which made U.S. newsreels in 1948, now rebuilt.

*Aaron E. Carpenter*  
CHAIRMAN OF THE BOARD.

## Tanks to Houghto-Draw

Drawing of gas tank half sections in one simultaneous operation is being done by a large steel processor with the aid of a mixture of two Houghto-Draw compounds.

A 38½" blank of steel .105" thick is drawn into a shape 24" deep, eliminating four to six operations formerly required. The complete cycle, including automatic loading and unloading, takes only 24 seconds. A mixture of 5 ounces each of Houghto-Draw 356 and 357 to the gallon of water at 130° F. did the trick. Discs were coated, dried and drawn without squealing or chatter, which had been a problem. After drawing 50 sections satisfactorily, they tried the previous compound, but the squeal was again heard. It disappeared when they returned to Houghto-Draw.

The Houghton technical man in your section will recommend, after review and trial, the best Houghto-Draw for your drawing need. And he'll stay on the job until he makes it work. Want to see him?

## Why Rectify?

So simple a part as a bolt for a lift truck may present a heat treating problem. One manufacturer had heated bolts in salt, but had trouble keeping the bath in balance. He had rectified the bath three times a day, and desludged it each day. Then he switched to Houghton's *Liquid Heat 1145*, with a quench in our treated quenching oil. Results: time saved on rectification, hardness increased, no decarburized work.



## Double Tool Life at ½ the Oil Cost

Which would you use—a cutting fluid which costs 46 cents per gallon, and which permitted 21,600 pieces between tool grinds, or a fluid which cost 16 cents per gallon, mixed with water, that so lubricated the tools as to enable 54,000 pieces to be machined without a tool grind? The answer is obvious. You'd do what that company did—standardize on *Antisept All-Purpose Base*, miscible with water, yet having a higher film strength than straight oil. Better look into this base, which will do 90% of your cutting jobs, and do them better.

## No Mystery About Salt, But—

The day has passed when the composition of heat treating salts was a mystery. Nearly every metallurgist knows, or can learn from standard reference books, how to formulate salt mixtures for various heat treatments of steel.

Why, then, should they not make up their own mixtures from basic chemicals and save money? Or, why shouldn't they buy on lowest price per pound? Sounds plausible, but it's not being done, even by the largest users. And there are good reasons why not.

In the first place, operating difficulties require more knowledge than a man equipped with a price list and chart of salt melting points can hope to have.

Most salt mixtures are based on some thirty nitrates, nitrites, carbonates, chlorides, fluorides, cyanides, etc. These materials are obtained from a limited number of sources known to most metallurgists.

But the strict control exercised over incoming shipments by Houghton, based on many years of experience, sets up a safeguard against possible impurities in the salts. Each lot is sampled and analyzed in our Laboratory.

Impurities even to the third decimal point may affect the service a chemical gives in heat treating. Even a C. P. (Chemically Pure) salt may contain a prescribed maximum of such impurities. Such contaminants as chlorides in a nitrate bath or sulphates in a hardening salt would tend to attack the work or pot after continued operation.

Rectification of a salt bath isn't always easy. It takes time and experience. Our own practice has been to make such baths as nearly self-rectifying as possible by including, wherever we can, a rectifying element in the salt mixture itself which prevents decarburization.

Proper mixing of the ingredients is most essential, as the formula is set up for an

eutectic mixture; if improperly compounded, the batch may vary and cause trouble when the salts are put under heat. There's still another very sound reason for buying salts from an experienced, reputable supplier. That is service.

The Houghton Man who calls on you is likely to be a specialist himself, in heat treating and in metal working, all the way from iron and steel to the finished, heat-treated, machined piece. He is not a salt specialist alone; often he is an engineering graduate with long field experience. Behind him are metallurgical engineers ready to help him and his customers.

Those technicians look further than the salt if the user isn't getting the results he wants. They may go back to furnace design, or to steel analysis, or shape of part—or look ahead to the quench or draw or final cleaning.

While metallurgy itself has become a pretty exact science, there is still a certain amount of experimentation necessary, and plant metallurgists are quick to admit that counsel and advice from our trained field specialists and research staff men have helped them out of many difficulties.

So there's the purity of salts, the know-how in manufacturing them, and the ability to step into a plant and make them perform right—three good reasons why metal men prefer to buy salts from Houghton. Maybe you can buy salt at a lower price per pound, but the service is worth the small extra amount it may cost. Think it over!

## Can You Use This Helpful Data?

Check the items you'd like to receive, and attach this slip to your letterhead, mailing to address below. The material will be sent free, without obligation.

1. Liquid Salt Bath Catalog—32 pages of description and working ranges of Houghton salts for heat treating.
2. "All-Star" Line-up of Rust Preventives—8 page booklet listing the Rust Veto "Winning Eleven."
3. Hydraulic Oil technical bulletin; setting forth the merits of treated Hydro-Drive Oils, with test data.
4. Product Data Sheet on Houghto-Draw 357 for wire, rod, bar and tube drawing.
5. Houghto-Clean 220 Data Sheet, describing emulsion-type cleaner for metals.

**E. F. HOUGHTON & CO.**  
303 W. LEHIGH AVENUE  
PHILADELPHIA 33, PA.

*I know—*

**“CERTIFIED”**

**is the best abrasive**

As Purchasing Agent I have to see that the abrasive we use is the most economical. This means a hard, slow wearing abrasive like "Certified" . . . one that can be used over and over. An abrasive that does a good job in the cleaning room . . . one that gets castings really clean in a hurry.



**"CERTIFIED" IS TOPS!** Each grain of Samson Shot and Angular Grit is a solid homogenous mass that wears slowly, lasts longer for top-efficiency blast cleaning at lowest cost. "Certified's" special automatically controlled hardening process gives 'em plenty of extra hardness for cleaner castings. Order "Certified" today for faster, better, cheaper blast cleaning.

*Always specify "Certified"*

**PITTSBURGH  
CRUSHED STEEL CO.  
PITTSBURGH, PENNA.**

**STEEL SHOT  
AND GRIT CO.  
BOSTON, MASS.**

**FREE**

**PUBLICATIONS**

*Continued from Page 36*

dimensions, how to measure machine torque, how to increase speed reducer motor life, and a listing of typical motor applications. *Bodine Electric Co.*

For free copy insert No. 7 on postcard, p. 37.

**New Technical Bulletins**

Two new technical bulletins cover the properties of high nickel alloys. One is entitled "Engineering Properties of Inconel," which also contains material on Inconel X, one of the newer age-hardenable Inco nickel alloys. The other deals with the engineering properties of K and KR Monel. Both bulletins are 24 p. in length and contain charts, tables on compositions and properties, working instructions and other information of a technical nature. *International Nickel Co., Inc.*

For free copy insert No. 8 on postcard, p. 37.

**Sintering Powdered Metal**

The complete Lindberg line of sintering furnaces is described in a new 8-p. bulletin covering hand pusher batch type furnaces, mesh belt furnaces, mechanical pusher and roller hearth furnaces. All the units presented, except the hand pusher type, are for continuous operation. Also included is a substantial discussion of proper atmosphere generators for use with the furnaces. *Lindberg Engineering Co.*

For free copy insert No. 9 on postcard, p. 37.

**Electrical Enclosures**

Among the many items shown in a new 16-p. catalog on custom built sheet metal electrical enclosures are control desks, cubicles, electrical cabinets, enclosures, power distribution and control panels, switch gear housings and louvres. Also included are descriptions of transformers, tanks and instrument panels. *Kirk & Blum Mfg. Co.*

For free copy insert No. 10 on postcard, p. 37.

*Resume Your Reading on Page 37*

## The Biggest Thief in America

ALL through the summer—through hot, humid days and hot, humid nights—the biggest thief in America will be raiding your plant, stealing your profits, stealing your steel.

In every department—where raw steel comes in, where it is stamped or milled or machined or ground, where it is pickled or cleaned or assembled—the moisture in the air is always helping that big thief, RUST, to rob you of production—atom by atom—taking pennies and dimes and dollars out of your pocket.

But you don't have to put up with

this monstrous moist-month thievery. The Oakite Technical Service Representative in your vicinity can help you fight and conquer RUST. He is well equipped with methods and materials for:

1. Removing rust from raw stock
2. Preventing rust while parts are being processed
3. Cleaning and de-rusting in one operation
4. Cleaning with simultaneous conditioning for painting plus protection against rust before and after the metal is painted.

**FREE** Write today for full information on Oakite methods for arresting RUST in every part of your plant.

# OAKITE

TRADE MARK REG. U. S. PAT. OFF.

Technical Service Representatives Located in  
Principal Cities of United States and Canada

OAKITE PRODUCTS, INC.  
24 Thames Street, New York 6, N. Y.  
Send me, without obligation, complete information on  
Oakite methods for:

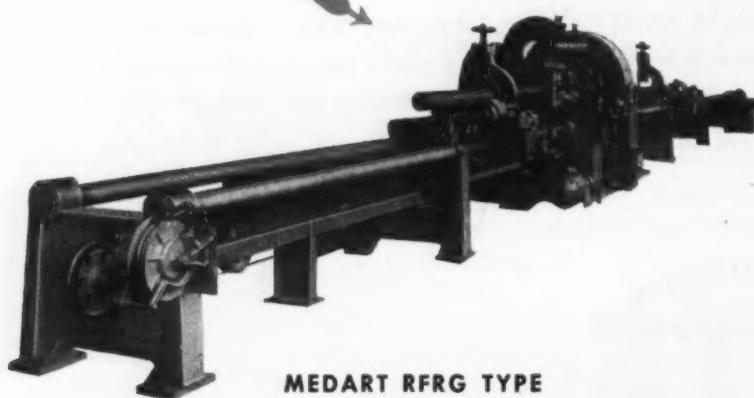
Removing rust       Preventing rust  
 Cleaning and de-rusting in one operation       Cleaning and paint-conditioning with rust prevention

Name.....  
Company.....  
Address.....

## A NEW BAR AND TUBE TURNER

- ✓ ... automatic centering with roll-type positive, continuous feed
- ✓ ... separate drives for cutting tool and bar feed for infinite ratios
- ✓ ... two individual automatic-grip carriages
- ✓ ... production on rough peel or precision work
- ✓ ... 100% chip recovery

The new Medart RFRG type turning machine gives the exact ratio between cutting speed and bar feed rate for superior finish and close tolerance in precision turning, and high production on rough peeling or scalping. Speed and range of materials turned is limited only by the capacity of present day cutting tools. This new machine is completely push-button operated, and its improved, direct drive is actually simpler . . . easier to operate!



MEDART RFRG TYPE



# NEW

## PRODUCTION IDEAS

Continued from Page 37

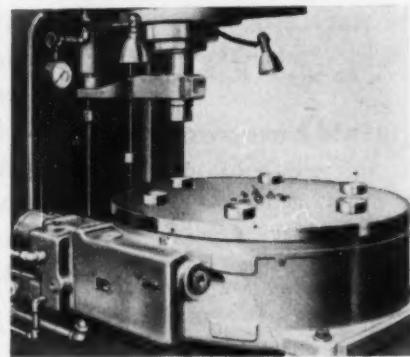
sulated with mineral or glass wool. Side swinging insulated doors are equipped with positive explosion-proof latches. Statically and dynamically balanced fans effect uniform recirculation of heated air. Gravity stacks with adjustable damper provide exhaust control of volatiles or vapors. *W. S. Rockwell Co.*

For more data insert No. 24 on postcard, p. 37.

### Index Table

10 to 70 indexes per minute.

A 33-in. automatic index table with 24-in. work-circle is hydraulically powered, provides variable speeds for any preselected indexing rate from 10 to 70 indexes per min, and positions the dial with an ac-



curacy of  $\pm 0.002$  in. When installed on a Multipress, it is powered by the pumping unit of the press through the control system. The table can be operated by a small auxiliary pumping unit when used with other than hydraulic equipment. Six and 12 station types are available. *Denison Engineering Co.*

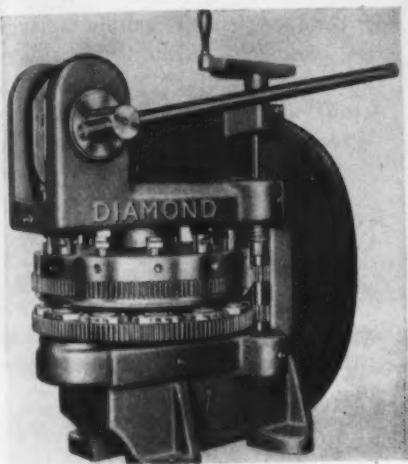
For more data insert No. 25 on postcard, p. 37.

### Turret Punch Press

No dies to make or set; reduced production costs.

The cost of piercing, embossing, or forming parts in quantities less than 500 is reduced with the use of an improved hand operated turret punch press. The press has a 13-in. throat and contains 12 punches and dies, any of which

may be brought under the ram for immediate use by a twirl of the index handle. Capacity is 10 tons and maximum punch size is 1½ in. with ½ in. mild steel. Anti-back-



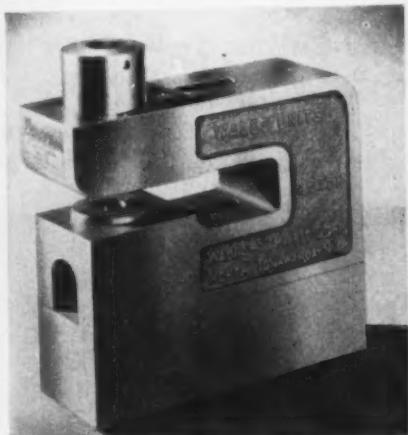
lash gearing of turrets keeps punches in permanent precision alignment. A special punch permits piercing of steel up to twice the punch diameter within the machine capacity. *Diamond Machine Tool Co.*

For more data insert No. 26 on postcard, p. 37.

#### Hole Punching Unit

Independent, self-contained; uses three-piece Split Punch.

For punching holes in ½-in. thick mild steel extra heavy duty hole punching units are equipped with Split Punches. The punch



collapses sufficiently to free itself from the wall after punching the hole. Only small lifter springs are required to raise the punch assembly to the up position. The units are self-contained: the Split Punch assemblies, dies, guides and lift springs are the component

July 6, 1950

The ABC of MST

A LWAYS MAKES POSSIBLE  
B ETTER PRODUCTS  
C AT LOWER COST



Design simplification, fabricability, uniformity, ductility, ease of assembly and installation are just a few of the words we use to describe the many advantages of using MICHIGAN TUBING. Whether you manufacture automobile parts, power shovels, toys or typewriters, MICHIGAN TUBING can give you a better product at lower cost.

#### Uniform

STRENGTH, WEIGHT DUCTILITY, MACHINABILITY, WELDABILITY, I.D. and O.D.

#### Can be Bent,

FLANGED, EXPANDED, TAPERED, DEPRESS BEADED, EXPAND BEADED, ROLLED, EXTERNAL UPSET, INTERNAL UPSET, SPUN CLOSED, FORGED, BEVEL FLANGED, FLATTENED, SWAGED, FLUTED.



Consult us for engineering and technical help in the selection of tubing best suited to your needs.

A Quality Product,  
can be worked in your plant or  
prefabricated by MICHIGAN.



DISTRIBUTORS: Steel Sales Corp., Detroit, Chicago, St. Louis, Milwaukee, Indianapolis and Minneapolis—Miller Steel Co., Inc., Hillside, N. J.—C. L. Hyland, Dayton, Ohio—Dirks & Company, Portland, Oregon—James J. Shannon, Milton, Mass.—Service Steel Co., Los Angeles, Calif.—American Tubular & Steel Products Co., Pittsburgh, Pa.—Strong, Carlisle & Hammond Co., Cleveland, Ohio—A. J. Fitzgibbons Co., Buffalo, N. Y.

33 Years in the Business

9450 BUFFALO STREET • DETROIT 12, MICHIGAN

FACTORIES: DETROIT, MICHIGAN • SHELBY, OHIO

## NEW PRODUCTION IDEAS

*Continued*

### why starve your automatics . . .

#### FOLLANSBEE COLD ROLLED STRIP feeds right

from the coil into your automatic machines. There's real efficiency and time-saving economy in the continuous supply of presses, roll-formers, and other automatics. These high-speed machines need never starve for material because you can feed Follansbee Cold Rolled Strip directly from the coil.

### making gadgets for gourmets?

#### FOLLANSBEE COLD ROLLED STRIP is manufactured

in a range of tempers, and with the proper finish, for making turners, mixers, beaters, and a myriad other profitable specialties. Custom-made Follansbee Cold Rolled Strip, in continuous coils, is furnished to your specifications. You should be taking advantage of the machining quality of Follansbee Cold Rolled Strip and Follansbee Polished Blue Strip. Just call the Follansbee Steel Representative nearest you.

#### FOLLANSBEE STEEL CORPORATION

GENERAL OFFICES, PITTSBURGH 3C, PA.

COLD ROLLED STRIP • ELECTRICAL SHEETS • POLISHED BLUE SHEETS  
SEAMLESS JERSEY ROLL ROOFING

Sales Offices—New York, Philadelphia, Rochester, Cleveland, Detroit, Milwaukee. Sales Agents—Chicago, Indianapolis, St. Louis, Kansas City, Nashville, Houston, Los Angeles, San Francisco, Seattle; Toronto and Montreal, Canada. Plants—Follansbee, W. Va.

Follansbee Metal Workshops—Pittsburgh, Pa.;  
Rochester, N. Y., and Fairfield, Conn.



## NEW PRODUCTION IDEAS

*Continued*

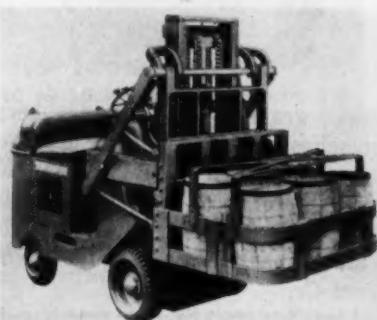
parts designed into the holders. Nothing is attached to the press ram; the only function of the ram is to depress the assembly through the work. Interchangeable use of the same group of units permits setups of unlimited hole punching patterns. *Wales-Strippit Corp.*

For more data insert No. 27 on postcard, p. 37.

#### Keg Handling Device

Without pallets handles six 200-lb kegs in single maneuver.

In a single maneuver, six 200-lb kegs of spikes can be picked up, transported, stacked and unloaded



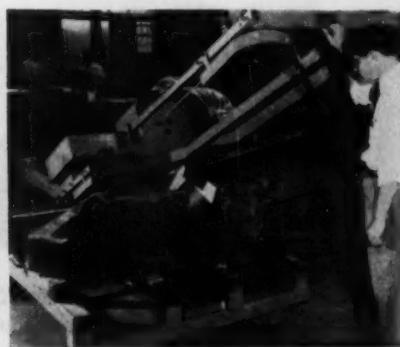
by using a new hydraulic keg handling device. The six kegs are held securely in position by a guide frame mounted on a Towmotor Unloader Accessory, and are firmly pressed against projecting shoes. Shoes and guide frame are detachable. *Towmotor Corp.*

For more data insert No. 28 on postcard, p. 37.

#### Die-Cutting Saw

Cuts obsolete drop hammer dies in pieces for melting.

The problem of melting obsolete drop hammer dies too large to go



in a furnace has been simplified by the use of a saw that cuts the dies into pieces. The saw, developed on the band saw principle, cuts steel, zemak or lead dies. Dies weighing



THE CONGREGATIONAL CHURCH OF MANHASSET, Manhasset, New York. Fabricated and erected by American Bridge Company. This 222-ton structure consists of: church proper—45' x 130', chapel—22' x 80', Minister's study—25' x 25', parish hall—45' x 95', school wing—42' x 105', and beginners' wing—35' x 80'. Architects—Magoon and Salo. Consulting Engineers—Wilcox and Erickson.

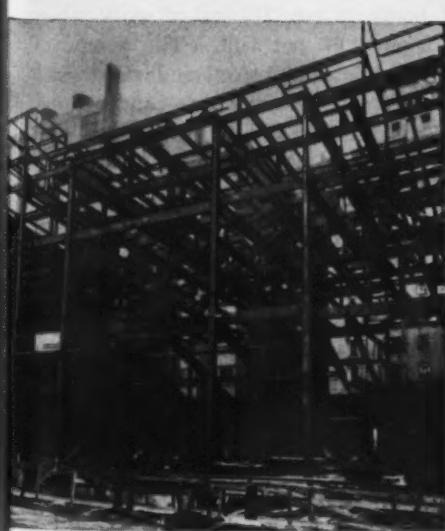


THE MOUNT OLIVET LUTHERAN CHURCH, 50th and James Avenue, South, Minneapolis, Minnesota. Fabricated by American Bridge Company. One hundred fifty tons of structural steel was furnished for this structure. Architect—Hugo C. Haeuser.

*For  
sanctuaries, too~*  
**A FRAMEWORK  
OF STEEL**



THE HOLY ANGELS CHURCH, Gary, Indiana. Fabricated and erected by American Bridge Company. This church building, 166' x 39', has two wings 28' x 39' and one fleche. One hundred thirty tons of structural steel comprised the framework of this structure. Architect—A. F. Moratz.



THE FREE SYNAGOGUE, 30 West 68th Street, New York City. Fabricated and erected by American Bridge Company. This 500-ton, 3-story building, with balcony framing is 99' x 100'. Architects—Bloch and Hesse. Engineer—A. D. Grossett.



To help you take advantage of the superiority of steel for structures of all types, American Bridge Company places its experience and facilities for fabrication and erection at your service. We suggest that you contact our nearest Contracting Office.

#### AMERICAN BRIDGE COMPANY

General Offices: Frick Building, Pittsburgh, Pa.

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DETROIT • DULUTH • ELMIRA • GARY • MINNEAPOLIS • NEW YORK • PHILADELPHIA  
PITTSBURGH • PORTLAND, ORE. • ST. LOUIS • SAN FRANCISCO • TRENTON  
UNITED STATES STEEL EXPORT COMPANY, NEW YORK



# AMERICAN BRIDGE

UNITED STATES STEEL



**NATURE**  
provides trees  
with an armor of  
protective BARK

**BOTH** give  
protection!

**INGERSOLL**  
provides carbon steel  
sheets with a protec-  
tive armor of **SOLID**  
**STAINLESS STEEL**

At Borg-Warner's Ingersoll Steel Mills, we produce sheets of a remarkable steel that gives real stainless protection on the contact side. The actual photograph (at left) of a machine cutting, greatly enlarged, shows how perfectly the cladding of 20% solid stainless is bonded to an 80% backing of carbon steel to form—

**INGACLAD**  
STAINLESS-CLAD STEEL

The uses are widespread . . . the cost considerably lower than for the solid stainless metal. It will pay you to investigate the fabricating advantages and economies of IngClad.

*Ingersoll also produces Solid Stainless Sheets and Heat-Resistant Steels. Your inquiries are invited.*

**Ingersoll STEEL DIVISION**  
**BORG-WARNER CORPORATION**  
310 South Michigan Avenue • Chicago 4, Illinois  
Plants: Chicago, Illinois • New Castle, Indiana • Kalamazoo, Michigan



## NEW PRODUCTION IDEAS

*Continued*

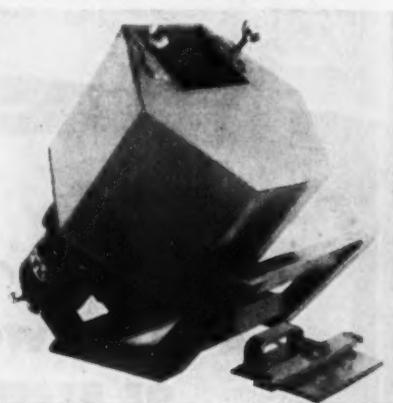
approx 5 tons are said to have been cut in two in 55 min. One man can operate the saw which has a counterbalance and operates like a see-saw. *Glenn L. Martin Co.*

For more data insert No. 29 on postcard, p. 37.

### Tumbling Machine

**Self-tumbling, low cost unit.**

Tool shops will find the portable bench type tumbler useful to create edge radius on tool components, remove heat treat scale and clean up work. It can be used by stamping and screw machine shops to remove burrs and sharp edges of small



work. The machine is hexagonal shaped; 8 in. wide x 11 in. diam. It is welded, steel construction; holds approx 2½ gal of work when loaded 60 pct full. The compartment is belt driven and rotated at 16 rpm. The machine can be lined with rubber for bright finishing of metals. *American Plating Rack Co.* For more data insert No. 30 on postcard, p. 37.

### Electric Hoist

**One-ton Load Lifter features compactness and easy servicing.**

The hoist can be serviced without taking it down from its overhead support or track. It is controlled by pushbuttons with 24 v at the buttons for safety. Main frame is steel; housings and covers are aluminum alloy. The motor brake is the multiple disk type with the friction disks operating in oil. The hoist is available for lug suspension, standard push geared type and motor driven trolleys. *Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc.* For more data insert No. 31 on postcard, p. 37.

*Resume Your Reading on Page 41*

## Briefs and Bulletins

**part of pattern**—Armco Steel Corp. advanced the prices of its stainless hot and cold rolled sheets, cold rolled strip, hot and cold drawn bars, wire, forging billets and angles by 1½¢ per lb. on both the nickel-chrome and straight chrome grades. The advance was effective June 29 and followed that of United States Steel Corp. subsidiaries (THE IRON AGE, June 29, p. 105). Neither company moved the price of plates. Armco does not publish prices of hot rolled strip, ingots, or rerolling billets.

**scrap pile autos**—More prewar jalopies now creaking along on last legs will be laid to rest in scrap piles this year than in many years past, recognized directors of the National Auto Wreckers Assn., meeting recently in Los Angeles. High new car production will exert powerful pressure to remove the crates from highways and with the resultant drop in salvaged parts business, wreckers will turn over more old cars to the scrap heap.

**French branch**—The Yoder Co., Cleveland, is planning to establish a branch plant in Paris. John J. Lucas, president, said the company will acquire a controlling interest in a French machine shop, where roll-forming equipment, rotary gang slitters and electric-weld tube mills will be built. The company expects to begin operations in September. Mr. Lucas said the plan is part of a program to strengthen the company's position in world markets.

**consumer prices**—Sears Roebuck & Co.'s fall and winter general catalog, considered by some a barometer of consumer price trends, indicates a firm price outlook. Of some 2280 items listed, 42 pct were unchanged from last fall. The remainder were about evenly divided between increases and decreases.

**galvanized pipe up**—A price rise of about \$6 per ton on galvanized steel pipe in sizes ½ in. and larger was made effective on June 28 by the National Tube Co. Justification for the advance, the company noted, were increases of \$105 per ton in the price of zinc since Dec. 16, 1949.

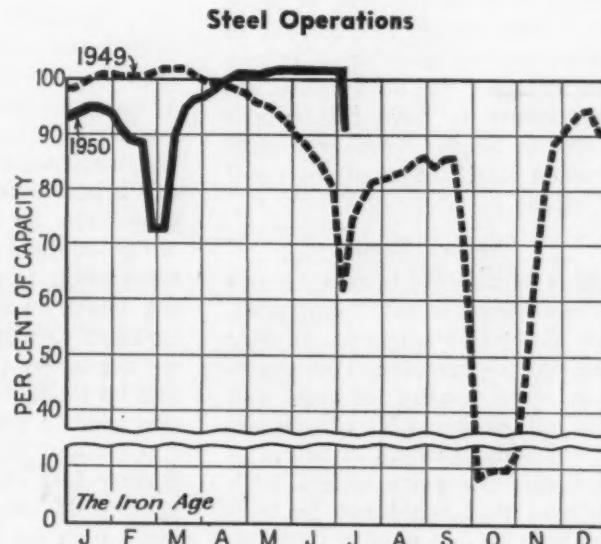
**no steel**—Nash shut down its Grand Rapids appliance plant last week for lack of steel. This plant makes refrigerator shells. No opening date has been set.

**first since war**—Carnegie-Illinois Steel Corp. announces what is believed to be the first 100 pct blast furnace operation in the Chicago district since the end of the war. It was brought about when the No. 3 blast furnace was put on at Gary, Ind., recently. At present 11 furnaces are on at South Chicago and 12 at Gary—for a total of 23 operating.

**Detroit prediction**—The auto industry will build 8 million cars and trucks in 1950, forecasts C. E. Wilson, president of General Motors. Best estimates of auto output in the first half of the year are 3,724,000 vehicles. Things are expected to bust out all over after the July 4 slowdown.

**spring steel advance**—At the same time as it increased its price of cold-rolled carbon strip \$7 per ton to \$4.50 per 100 lb. base, June 5, Sharon Steel Corp. advanced the price of 0.2 to 0.40 cold-rolled spring steel a similar amount to \$4.50 base.

**out of blast**—Carnegie-Illinois Steel Corp. announced that its Carrie furnace was shut down June 22 for relining.



District Operating Rates—Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
June 25.....	103.0	102.0*	92.0*	88.0	89.0*	104.0	101.0	104.0	109.0*	103.8	84.5	88.9	110.0	101.5
July 2.....	98.0	101.0	88.0	75.0	52.0	104.0	92.0	104.0	103.0	99.0	64.5	85.0	40.0	92.0

\* Revised.

# Nonferrous Metals Outlook

## Market Activities

**Copper tariff to go into effect July 1 . . . Fabricators required to pay 2¢ more for foreign copper . . . Carteret refinery on strike . . . Magnesium products raised**



by JOHN ANTHONY

**New York**—Toward the end of last week it appeared certain that a 2¢ copper tariff would go into effect on July 1. The House move for a 60-day suspension to bridge the gap until more permanent legislation could be put through seemed doomed to defeat.

In the meantime, consumers have bought copper from foreign producers with the duty for the account of the buyer. Some consumers will be required to make use of this copper at once due to the shortage of inventories. Others are reported to have made arrangements to have this copper placed in bonded warehouse until pending clarification of the tariff situation.

### Absorb Tariff

This is expected to create a two price system for fabricated products that could not continue very long under present market conditions. The demand for brass and wire mill products is very strong. A price spread would be bound to flood the low price sellers with business that could not be handled by a limited number of mills.

### MONTHLY AVERAGE PRICES

The average prices of the major nonferrous metals in June based on quotations appearing in THE IRON AGE, were as follows:

	Cents Per Pound
Electrolytic copper, Conn. Valley	22.269
Lake Copper, Conn. Valley	22.494
Straits tin, New York	77.70
Zinc, East St. Louis	14.769
Zinc, New York	15.489
Lead, St. Louis	11.608
Lead, New York	11.808

### Korea and Copper

Some factors suggest that foreign producers might be able to absorb the tariff on their foreign copper. But this solution is advanced without a realistic appraisal of the current strong copper market or the tax structure of Chile, heavily dependent on income from its copper mines.

But another factor has entered the picture in the last week with the attack on Korea. The copper industry as a whole has not been willing to see the price of copper and its products advance to levels that place a premium on competitive metals. But now there is the further fear of government intervention if the price should be pushed up too high. But in the

meantime consumers will be paying the 2¢ duty, and observers feel that this is bound to push up the copper and brass markets.

The Carteret Refinery of American Metal Co. is on strike again, largely due to the incentive wage plan in operation at that plant to which the union objects. In conjunction with the current weakness of the nonferrous foundry business, this has created a technical weakness in the Eastern copper and brass scrap markets. One factor that had been paying premiums for scrap has withdrawn its higher prices. So the scrap price movement is no longer exerting strong pressure on the copper market.

### Might Go Lower

The lead price took another 1/2¢ drop last week. Producers report that the market is quiet. Some observers feel that the market might go even lower, judging by the heavy volume of foreign metal being offered.

Magnesium wrought products have been advanced by The Dow Chemical Co. Commercial grade M and FS sheets have been advanced 4¢ a lb in gages of 0.032 and heavier. Specification grade sheets in M and FS-1 alloys were raised 6¢ per lb. Commercial grade extrusions in FS alloy were advanced 2¢ per lb. M alloy extrusions will sell at the same prices as FS alloy.

### NONFERROUS METALS PRICES

	June 28	June 29	June 30	July 1	July 3
Copper, electro, Conn. ....	22.50	22.50	22.50	22.50	22.50
Copper, Lake, Conn. ....	22.625	22.625	22.625	22.625	22.625
Tin, Straits, New York ....	78.25	78.25	78.50	....	*79.50
Zinc, East St. Louis ....	15.00	15.00	15.00	15.00	15.00
Lead, St. Louis ....	10.80	10.80	10.80	10.80	10.80

Note: Quotations are going prices.  
\*Tentative.

## MILL PRODUCTS

### Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.088 in., 30.3¢; 27.4¢; 4S, 61S-O, 29.3¢; 52S, 31.4¢; 24S-O, 24S-OAL, 30.3¢; 75S-O, 75S-OAL, 36.8¢; 0.081 in., 2S, 3S, 23.4¢; 4S, 61S-O, 30.7¢; 52S, 32.5¢; 24S-O, 24S-OAL, 31.4¢; 75S-O, 75S-OAL, 38.5¢; 0.032 in., 2S, 3S, 30.4¢; 4S, 61S-O, 34.0¢; 52S, 36.7¢; 24S-O, 24S-OAL, 38.4¢; 75S-O, 75S-OAL, 48.1¢.

Plate: 1/4 in. and heavier: 2S, 3S, F, 24.8¢; 4S-F, 27¢; 52S-F, 28.1¢; 61S-O, 27.6¢; 24S-F, 24S-FAL, 28.1¢; 75S-F, 75S-FAL, 34.9¢.

Extruded Solid Shapes: Shape factors 1 to 4, 33.6¢ to 67¢; 11 to 13, 34.3¢ to 79¢; 23 to 25, 36.8¢ to \$1.08; 35 to 37, 43.3¢ to \$1.66.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 34.5¢ to 31¢; Cold-finished, 0.375 to 3 in., 2S, 3S, 37¢ to 32.5¢.

Screw Machine Stock: Rounds, 11S-T3, R317-T4, 1/4 to 11/32 in., 49.5¢ to 38.5¢; 3/8 to 1 1/2 in., 88¢ to 36¢; 1 9/16 to 3 in., 36¢ to 33¢; 17S-T4 lower by 1¢ per lb, base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.; 2S, 36.5¢ to 27¢; 52S, 44.5¢ to 32.5¢; 56S, 47.5¢ to 39¢; 17S-T4, 50.5¢ to 35¢; 61S-T4, 45¢ to 34.5¢; 75S-T4, 76.5¢ to 55.5¢.

Extruded Tubing, Rounds: 63S-T5; OD in. 1/4 to 2, 33.5¢ to 49¢; 2 to 4, 30.5¢ to 41.3¢; 4 to 6, 31¢ to 37.8¢; 6 to 9, 31.5¢ to 39.3¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., \$1.008; 96 in., \$1.344; 120 in., \$1.679; 144 in., \$2.017. Gage 0.024 in. x 28 in., 72 in., \$1.224; 96 in., \$1.633; 120 in., \$2.042; 144 in., \$2.451. Coiled Sheet: 0.019 in. x 28 in., 24.7¢ per lb; 0.024 in. x 28 in., 23.7¢ per lb.

### Magnesium

(Cents per lb, f.o.b. mill, freight allowed)

Sheets and Plate: Ma, F5a, 1/4 in., 58¢ to 60¢; 0.0188 in., 60¢ to 62¢; B&S gage 8, 62¢ to 64¢; 10, 63¢ to 65¢; 12, 67¢ to 69¢; 14, 73¢ to 78¢; 16, 80¢ to 85¢; 18, 88¢ to 93¢; 20, \$1.00 to \$1.05; 22, \$1.22-\$1.31; 24, \$1.62-\$1.75. Specification grade higher. Base: \$0.0000 lb.

Extruded Round Rod: M, FS, diam. in., 1/4 in. to 0.311, 66¢; 1/2 in. to 3/4, 50¢; 1 1/4 to 1.749, 47¢; 2 1/2 in. to 5 in., 45¢. Other alloys higher. Base: Up to 3/4 in. diam., 10,000 lb; 1/2 in. to 1 1/2 in., 20,000 lb; 1 1/2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M, FS, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb per ft, per up to 3.5 in., 59.5¢; 0.22 to 0.23 lb per ft, per up to 5.9 in., 55¢; 0.50 to 0.59 lb per ft, per up to 8.6 in., 50.5¢; 1.8 to 2.59 lb per ft, per up to 19.5 in., 47.5¢; 4 to 6 lb per ft, per up to 28 in., 46.5¢. Other alloys higher. Base: in weight per ft of shape: Up to 1/2 lb, 10,000 lb; 1/2 lb to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, FS, wall thickness, outside diam., in., 0.049 to 0.057, 1/4 in. to 5/16, \$1.40; 5/16 to 3/4, \$1.26; 1/2 to 5/8, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, 5¢ to 5/8, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in. in.: Up to 1 1/2 in., 10,000 lb; 1 1/2 in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

### Nickel and Monel

(Base prices, cents per lb, f.o.b. mill)

"A" Nickel Monel  
Sheets, cold-rolled ..... 69 53  
Strip, cold-rolled ..... 75 56  
Rods and bars ..... 65 51  
Angles, hot-rolled ..... 65 51  
Plates ..... 67 52  
Seamless tubes ..... 98 86  
Shot and blocks ..... 46

### Copper, Brass, Bronze

(Cents per lb, freight prepaid on 200 lb)

	Extruded		
	Sheets	Rods	Shapes
Copper	37.43	33.28	37.03
Copper, h-r	34.53	34.53	34.53
Copper, drawn	35.52	35.21	35.21
Low brass	34.19	33.88	33.88
Red brass	35.96	35.65	35.65
Naval brass	38.90	32.96	34.22
Leaded brass	28.54	32.65	32.65
Com'l bronze	36.93	36.62	36.62
Manganese bronze	42.40	36.27	37.85
Phosphor bronze	55.11	55.36	55.36
Muntz metal	37.13	32.69	34.94
Everdur, Her-culoy, Olym-pic, etc.	42.05	40.99	40.99
Nickel silver	10 pct	45.48	47.74
Arch. bronze	45.48	47.74	32.65

## PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	17.50
Aluminum pig	16.50
Antimony, American, Laredo, Tex.	24.50
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	\$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	\$56.00
Bismuth, ton lots	\$2.00
Cadmium, del'd	\$2.15
Cobalt, 97-99% (per lb)	\$1.80 to \$1.87
Copper, electro, Conn. Valley	22.50
Copper, Lake, Conn. Valley	22.625
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.8%, dollars per troy oz.	\$2.25
Iridium, dollars per troy oz.	\$100 to \$110
Lead, St. Louis	10.80
Lead, New York	11.00
Magnesium, 99.8+%, f.o.b. Freeport Tex., 10,000 lb	21.50
Magnesium, sticks, 100 to 500 lb	37.50¢ to 39.50¢
Mercury, dollars per 76-lb flask f.o.b. New York	\$70 to \$71
Nickel, electro, f.o.b. New York	51.22
Nickel oxide sinter, f.o.b. Copper Cliff, Ont., contained nickel	44.25
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per troy oz.	\$66 to \$69
Silver, New York, cents per oz.	72.75
Tin, New York	79.50
Zinc, East St. Louis	15.00
Zinc, New York	15.72
Zirconium copper, 50 pct	\$6.20

## REMETALLED METALS

### Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot	21.75-22.00
No. 115	21.25-21.50
No. 120	20.75-21.00
No. 123	20.75-21.00
80-10-10 ingot	25.50
No. 305	23.50
No. 315	23.50
85-10-2 ingot	31.50
No. 210	29.00
No. 215	23.75-24.75
No. 245	23.75-24.75
Yellow ingot	18.25-19.00
No. 405	23.50
Manganese bronze	23.50
No. 421	23.50

### Aluminum Ingot

(Cents per lb, of 30,000 lb)

95-5 aluminum-silicon alloys	20.00-20.25
0.30 copper, max.	19.75-20.25
0.60 copper, max.	19.75-20.25
Piston alloys (No. 122 type)	18.50-19.00
No. 12 alum. (No. 2 grade)	17.75-18.25
108 alloy	18.50-19.00
195 alloy	19.50-20.00
13 alloy	20.00-20.25
AXS-679	18.50-19.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97 1/2%	19.25-19.50
Grade 2—92-95%	18.25-18.50
Grade 3—90-92%	17.25-17.50
Grade 4—85-90%	16.75-17.00

## ELECTROPLATING SUPPLIES

### Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	Cast, oval, 15 in. or longer	39 1/2
	Electrodeposited	33 1/2
	Rolled, oval, straight, delivered	36.59
	Forged ball anodes	41
Brass, 80-20	Cast, oval, 15 in. or longer	32 1/2
	Electrodeposited	27 1/2
	Rolled, oval, straight, delivered	36.59
	Ball anodes	21 1/2
Nickel 99 pct plus	Cast	68.00
	Rolled, depolarized	69.00
Cadmium		\$2.30
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.		79 1/2
Chemicals	(Cents per lb, f.o.b. shipping point)	
Copper cyanide, 100 lb drum		49 1/2
Copper sulfate, 99.5 crystals, bbl.		10 1/2
Nickel salts, single or double, 4-100 lb bags, frt allowed		20 1/2
Nickel chloride, 375 lb drum		27 1/2
Silver cyanide, 100 oz lots, per oz		61 1/2
Sodium cyanide, 96 pct domestic		19.25
200 lb drums		7.15
Zinc sulfate, 89 pct granular		43 1/2

## SCRAP METALS

### Brass Mill Scrap

(Cents per pound; add 1/4¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

Copper	19 1/2	18 1/2
Yellow brass	16 1/2	16
Red brass	18 1/2	17 1/2
Commercial bronze	18 1/2	17 1/2
Manganese bronze	16 1/2	15 1/2
Leaded brass rod ends	16 1/2	...

### Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.50
No. 2 copper wire	18.50
Light copper	17.50
Refinery brass	17.75-18.00*
Radiators	13.00

\*Dry copper content.

### Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	19.50
No. 2 copper wire	18.50
Light copper	17.50
No. 1 composition	15.50-16.00
No. 1 comp turnings	15.00-15.50
Rolled brass	13.50
Brass pipe	15.00
Radiators	13.00-13.25
Heavy yellow brass	11.75-12.00

### Aluminum

Mixed old cast	10.00-10.25
Mixed old slips	10.75-11.00
Mixed turnings, dry	10.00-10.25
Pots and pans	10.00-10.25
Low copper	11.75-12.00

### Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

No. 1 heavy copper and wire	17	—17 1/2
No. 2 heavy copper and wire	16	—16 1/2
Light copper	15	—15 1/2
Auto radiators (unsweated)	11 1/2	—11 1/2
No. 1 composition	14	—14 1/2
No. 1 composition turnings	13 1/2	—13 1/2
Clean red car boxes	12 1/2	—13
Cocks and faucets	12 1/2	—13
Mixed heavy yellow brass	9 1/2	—9 1/2
Old rolled brass	10 1/2	—10 1/2
Brass pipe	12 1/2	—12 1/2
New soft brass clippings	14 1/2	—14 1/2
Brass rod ends	12 1/2	—12 1/2
No. 1 brass rod turnings	12	—12 1/2

### Aluminum

Alum. pistons and struts	6	—6 1/2
Aluminum crankcases	8 1/2	—9
2S aluminum clippings	11 1/2	—12
Old sheet and utensils	8 1/2	—9
Borings and turnings	5 1/2	—5 1/2
Misc. cast aluminum	8 1/2	—9
Dural clips (24S)	8 1/2	—9

### Zinc

New zinc clippings	10	—10 1/2
Old zinc	7 1/2	—8
Zinc routings	5 1/2	—5 1/2
Old die cast scrap	5 1/2	—5 1/2

### Nickel and Monel

Pure nickel clippings	36	—39
Clean nickel turnings	32	—35
Nickel anodes	36	—39
Nickel rod ends	36	—39
New Monel clippings	15	—19
Clean Monel turnings	10	—14
Old sheet Monel	14	—18
Inconel clippings	22	—26
Nickel silver clippings, mixed	9	—10
Nickel silver turnings, mixed	6	—7

### Lead

Soft scrap, lead	9	—9 1/2
Battery plates (dry)	4 1/2	—4 1/2

### Magnesium

Segregated solids	9	—10
Castings	5 1/2	—6 1/2

### Miscellaneous

Block tin	62	—64
No. 1 pewter	41	—43
No. 1 auto babbitt	37	—39
Mixed common babbitt	9 1/2	—9 1/2
Solder joints	12	—12 1/2
Siphon tops	37	—39
Small foundry type	12 1/2	—13
Monotype	11	—11 1/2
Lino. and stereotype	10 1/2	—11
Electrotype	9 1/2	—9 1/2
New type shell cuttings	15	—15 1/2
Hand picked type shells	6	—6 1/2
Lino. and stereo. dross	4 1/2	—4 1/2
Electro. dross	2 1/2	—3

**MARKETS-PRICES-TRENDS**



# SCRAP

## *Iron & Steel*

### Korean War Fails to Affect Scrap Trade

Even though conversion deals are still supporting the price of No. 1 heavy melting steel in all major markets, the trend in scrap prices continues in a downward direction. Where many of the prices remain unchanged, the general feeling of the market is softer.

Very little new buying by mills is reported and most brokers are just shipping on old orders. There is a feeling in the scrap industry that new orders will start coming in about a week when the mills have used up some of their scrap stockpiles.

The Far East situation has not yet had any tangible effect on scrap trade here but some individuals are anticipating a bearishness in the market because of it. Others point out that in the event of a widespread conflict scrap iron and steel would be among the first to feel price controls.

Another factor contributing to the stagnancy in the market was the anticipation of the 4-day Fourth of July holiday.

**PITTSBURGH**—Everybody is marking time until the freight jump at the mills is dissipated. There is little likelihood of new buying while consumers are busy taking in heavy tonnages on old orders. No. 1 heavy melting remained unchanged at \$42.00 top. No. 2 grade was off \$2.00, while No. 2 bundles dropped \$4.00 on a sale. Machine shop turnings were down \$2.00, and short turnings eased off 50¢. The railroad list was weaker.

**CHICAGO**—There was little activity in the Chicago area this week. A considerable amount of scrap was moving on old orders, but no interest was shown in the placing of new ones. One major consumer in the area claims to have enough dealer scrap to cover his July requirements. This does not include allocated scrap. Low phosphorus grades picked up a little after specialty consumers began evidencing interest in scrap shipments after the Fourth of July holiday.

**PHILADELPHIA**—The market here continued for the second week virtually unchanged. New buying by mills had not developed last week. Some distress cars are moving to fill old orders at a price \$1.00 under the quoted market. Scrap movement is badly handicapped by a shortage of cars. Yard cast is being bought \$1.00 below the previous price. Shipments to Pittsburgh were still under embargo late last week. Observers are under the impression that the war will have a bearish influence on the market. Further involvement might cause price controls over scrap at lower price levels

than the current ones. More interest is reported developing in the low phosphorus market.

**NEW YORK**—Since the Pittsburgh mills are not ordering, brokers here are just cleaning up old orders. Some brokers feel that this situation will clear up in another week. Meanwhile, prices remain at about the same level as last week. There was no change in any of the cast grades but the feeling was somewhat softer. Shovelings did show some strengthening and the price rose 50¢ a ton to a top of \$21.00.

**DETROIT**—Industrial lists sold here last week have reflected the downward trend in prices reported in **THE IRON AGE**. Most recent reports indicate that lists are continuing to bring lower prices. There has also been some reaction to war reports but with local mills out of the market temporarily this is not yet reflected in current buying prices. Most observers here appear to feel that the market is much closer to stability than it was a few weeks ago.

**CLEVELAND**—The Cleveland and Valley markets were quiet, but the undertone was soft. There were indications that some Valley business might develop this week, after the holiday. On the basis of broker offerings to one large Valley consumer, the price of No. 1 heavy melting there was off \$1.00. Cleveland prices held steady, excepting No. 1 railroad, which was off \$1.00.

**CINCINNATI**—The market was at a standstill pending a price test by district consumers. A small tonnage of No. 1 heavy melting was moved at \$36.50, but this was not enough to effect a change in price. The undertone was soft.

**BOSTON**—This market is still going through a period of weakness in reaction to the surges of a month ago. The Korean conflict has not had any effect on scrap as yet. Prices are much the same as last week, undergoing only readjustments. Turnings and borings alone show upward tendencies, with rises up to \$2.00 per gross ton.

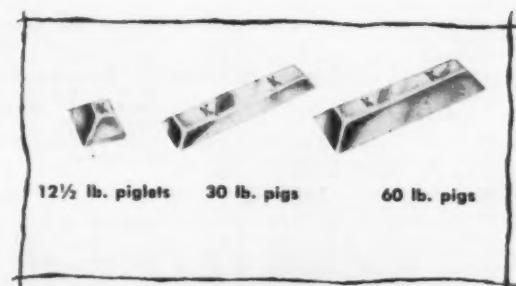
**BIRMINGHAM**—Scrap continues unchanged here and rather sluggish. Brokers are still shipping out old orders. There still is some buying in blast furnace, cast grades and electric furnace scrap. Dealers do not expect much change in the next week but say there may be some decline in prices after July 10.

**ST. LOUIS**—Although most other scrap iron items were lower in price in the St. Louis industrial district, No. 2 heavy melting steel was unchanged because of a short interest on orders placed for delivery July 15. Outside interests are pulling away from this market on shoveling turnings. Foundry interests are out of the market because of vacations.

**BUFFALO**—Pricewise the scrap market was marking time here this week. But shipments were reported to be fairly heavy and large tonnages were being offered. Reports of shipments of foreign scrap on the way have turned the market away from its rising spiral of recent weeks. Most sources here were trying to keep one eye on the market and the other on the situation in Korea. Until the situation becomes more clear no drastic price changes are expected.



Chief Keokuk Jr., although newly arrived, knows already that Keokuk pigs and piglets are consistently uniform in size, weight and metallurgical composition. All foundry and steel plant executives who use Keokuk Electro-Silvery will certainly agree that every shipment . . . every carload is *exactly* what they ordered. The "K" brand is *your* assurance of dependability!



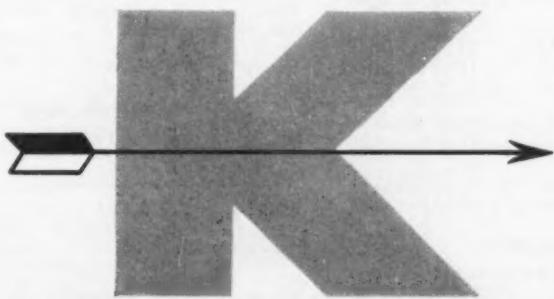
# KEOKUK

KEOKUK ELECTRO-METALS COMPANY

Keokuk, Iowa • Wenatchee Division: Wenatchee, Washington

SALES AGENTS: Miller and Company

332 S. Michigan Avenue, Chicago 4, Ill. • 3504 Carew Tower, Cincinnati 2, Ohio • 407 N. Eighth Street, St. Louis 1, Missouri.



## Iron and Steel

## SCRAP PRICES

## Pittsburgh

No. 1 hvy. melting	\$41.50 to \$42.00
No. 2 hvy. melting	33.50 to 34.00
No. 1 bundles	41.50 to 42.00
No. 2 bundles	29.50 to 30.00
Machine shop turn.	28.50 to 29.00
Mixed bor. and ms. turns.	28.50 to 29.00
Shoveling turnings	34.00 to 34.50
Cast iron borings	33.00 to 33.50
Low phos. plate	44.50 to 45.00
Heavy turnings	39.00 to 40.00
No. 1 RR. hvy. melting	44.50 to 45.00
Scrap rails, random lgth.	43.50 to 44.00
Rails 2 ft and under	47.00 to 48.00
RR. steel wheels	47.50 to 48.00
RR. spring steel	47.50 to 48.00
RR. couplers and knuckles	47.50 to 48.00
No. 1 machinery cast	43.50 to 44.00
Mixed yard cast	38.00 to 38.50
Heavy breakable cast	34.00 to 35.00
Malleable	44.00 to 45.00

## Chicago

No. 1 hvy. melting	\$37.00 to \$38.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 factory bundles	37.00 to 38.00
No. 1 dealers' bundles	37.00 to 38.00
No. 2 dealers' bundles	32.00 to 33.00
Machine shop turn.	24.50 to 25.50
Mixed bor. and turn.	25.00 to 26.00
Shoveling turnings	26.00 to 27.00
Cast iron borings	25.00 to 26.00
Low phos. forge crops	42.50 to 43.50
Low phos. plate	40.50 to 41.50
No. 1 RR. hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	43.00 to 44.00
Rerolling rails	49.00 to 50.00
Rails 2 ft and under	47.00 to 48.00
Locomotive tires, cut	44.00 to 45.00
Cut bolsters & side frames	40.00 to 41.00
Angles and splice bars	45.00 to 46.00
RR. steel car axles	57.00 to 58.00
RR. couplers and knuckles	44.50 to 45.50
No. 1 machinery cast	45.00 to 46.00
No. 1 agricultural cast	43.00 to 44.00
Heavy breakable cast	37.00 to 38.00
RR. grade bars	36.00 to 37.00
Cast iron brake shoes	36.00 to 37.00
Cast iron car wheels	41.50 to 42.50
Malleable	47.00 to 48.00

## Philadelphia

No. 1 hvy. melting	\$33.50 to \$34.00
No. 2 hvy. melting	30.50 to 31.50
No. 1 bundles	33.50 to 34.50
No. 2 bundles	27.00 to 28.00
Machine shop turn.	23.00 to 24.00
Mixed bor. and turn.	21.00 to 22.00
Shoveling turnings	25.00 to 26.00
Low phos. punchings, plate	37.00 to 38.00
Low phos. 5 ft and under	37.00 to 38.00
Low phos. bundles	34.00 to 35.00
Hvy. axle forge turn.	33.50 to 34.50
Clean cast chem. borings	33.00 to 34.00
RR. steel wheels	39.00 to 40.00
RR. spring steel	39.00 to 40.00
Rails 18 in. and under	41.00 to 42.00
No. 1 machinery cast	39.00 to 40.00
Mixed yard cast	33.00 to 34.00
Heavy breakable cast	35.00 to 36.00
Cast iron carwheels	40.00 to 41.00
Malleable	42.00 to 43.00

## Cleveland

No. 1 hvy. melting	\$39.50 to \$40.00
No. 2 hvy. melting	34.50 to 35.00
No. 1 busheling	39.50 to 40.00
No. 1 bundles	39.50 to 40.00
No. 2 bundles	29.50 to 30.00
Machine shop turn.	25.50 to 26.00
Mixed bor. and turn.	28.50 to 29.00
Shoveling turnings	28.50 to 29.00
Cast iron borings	28.50 to 29.00
Low phos. 2 ft and under	41.50 to 42.00
Steel axle turn.	39.50 to 40.00
Drop forge flashings	40.50 to 41.00
No. 1 RR. hvy. melting	44.00 to 44.50
Rails 3 ft and under	48.00 to 49.00
Rails 18 in. and under	49.00 to 50.00
No. 1 machinery cast	46.00 to 47.00
RR. cast	46.00 to 47.00
RR. grade bars	34.00 to 35.00
Stove plate	38.00 to 39.00
Malleable	44.00 to 45.00

## Youngstown

No. 1 hvy. melting	\$41.00 to \$41.50
No. 2 hvy. melting	37.00 to 37.50
No. 1 bundles	42.00 to 42.50

Going prices as obtained in the trade  
by THE IRON AGE, based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

No. 2 bundles	\$32.50 to \$33.00
Machine shop turn.	32.00 to 32.50
Shoveling turnings	34.00 to 34.50
Cast iron borings	34.00 to 34.50
Low phos. plate	44.00 to 44.50

## Buffalo

No. 1 hvy. melting	\$38.00 to \$39.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 busheling	35.00 to 36.00
No. 2 bundles	36.00 to 37.00
Machine shop turn.	29.00 to 30.00
Mixed bor. and turn.	29.00 to 30.00
Shoveling turnings	31.00 to 32.00
Cast iron borings	29.00 to 30.00
Low phos. plate	41.00 to 42.00
Scrap rails, random lgth.	39.00 to 40.00
Rails 2 ft and under	45.00 to 47.00
RR. steel wheels	42.00 to 43.00
RR. spring steel	42.00 to 43.00
RR. couplers and knuckles	42.00 to 43.00
No. 1 machinery cast	37.00 to 38.00
No. 1 cupola cast	34.00 to 35.00
Stove plate	36.00 to 37.00
Small Indus. malleable	37.00 to 38.00

## Birmingham

No. 1 hvy. melting	\$31.00 to \$32.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 bundles	27.00 to 28.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	25.00 to 26.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	24.00 to 25.00
Bar crops and plate	37.00 to 38.00
Structural and plate	36.00 to 37.00
Scrap rails, random lgth.	35.00 to 36.00
Rerolling rails	44.00 to 45.00
Rails 2 ft and under	44.00 to 45.00
Angles & splice bars	40.00 to 41.00
Std. steel axles	34.00 to 35.00
No. 1 cupola cast	38.00 to 39.00
Stove plate	33.00 to 34.00
Cast iron carwheels	33.00 to 34.00

## St. Louis

No. 1 hvy. melting	\$38.00 to \$39.00
No. 2 hvy. melting	32.00 to 33.00
No. 2 bundled sheets	32.00 to 33.00
Machine shop turn.	19.00 to 20.00
Shoveling turnings	24.00 to 25.00
Rails, random lengths	39.00 to 40.00
Rails 3 ft and under	45.00 to 46.00
Locomotive tires, uncut	40.00 to 41.00
Angles and splice bars	43.00 to 44.00
Std. steel car axles	52.00 to 53.00
RR. spring steel	41.00 to 42.00
No. 1 machinery cast	39.00 to 40.00
Hvy. breakable cast	36.00 to 37.00
Cast iron brake shoes	36.00 to 38.00
Stove plate	34.00 to 35.00
Cast iron car wheels	39.00 to 40.00
Malleable	44.00 to 45.00

## New York

Brokers' buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$30.50 to \$31.00
No. 2 hvy. melting	26.50 to 27.00
No. 2 bundles	24.50 to 25.00
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	20.50 to 21.00
Clean cast chem. bor.	28.00 to 29.00
No. 1 machinery cast	31.00 to 32.00
Mixed yard cast	29.00 to 29.50
Charging box cast	29.00 to 29.50
Heavy breakable cast	29.50 to 30.00
Unstrp. motor blocks	22.00 to 22.50

## Boston

Brokers' buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$28.00 to \$29.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 bundles	28.00 to 29.00

No. 2 bundles	\$22.00 to \$23.00
Machine shop turn.	20.00 to 20.50
Mixed bor. and turn.	18.50 to 19.00
Shoveling turnings	21.00 to 22.00
No. 1 busheling	26.50 to 27.50
Clean cast chem. borings	24.00 to 25.00
No. 1 machinery cast	30.00 to 31.00
No. 3 machinery cast	28.00 to 29.00
Heavy breakable cast	25.00 to 26.00
Stove plate	25.00 to 26.00

## Detroit

Brokers' buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$32.00 to \$33.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 bundles	37.00 to 38.00
New busheling	35.00 to 36.00
Flashings	32.00 to 33.00
Maching shop turn.	22.00 to 23.00
Mixed bor. and turn.	22.00 to 23.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	24.00 to 25.00
Low phos. plate	36.00 to 37.00
No. 1 cupola cast	40.00 to 41.00
Heavy breakable cast	31.00 to 32.00
Stove plate	34.00 to 35.00
Automotive cast	43.00 to 44.00

## Cincinnati

Per gross ton, f.o.b. cars:	
No. 1 hvy. melting	\$36.50 to \$37.00
No. 2 hvy. melting	30.50 to 31.00
No. 1 bundles	36.50 to 37.00
No. 2 bundles, black	29.50 to 30.00
No. 2 bundles, mixed	25.50 to 26.00
Machine shop turn.	20.50 to 21.00
Mixed bor. and turn.	20.50 to 21.00
Shoveling turnings	23.50 to 24.00
Cast iron borings	23.50 to 24.00
Low phos. 18 in. under	46.00 to 47.00
Rails, random lengths	41.50 to 42.00
Rails, 18 in. and under	49.00 to 50.00
No. 1 cupola cast	46.00 to 47.00
Hvy. breakable cast	35.50 to 36.00
Drop broken cast	48.00 to 49.00

## San Francisco

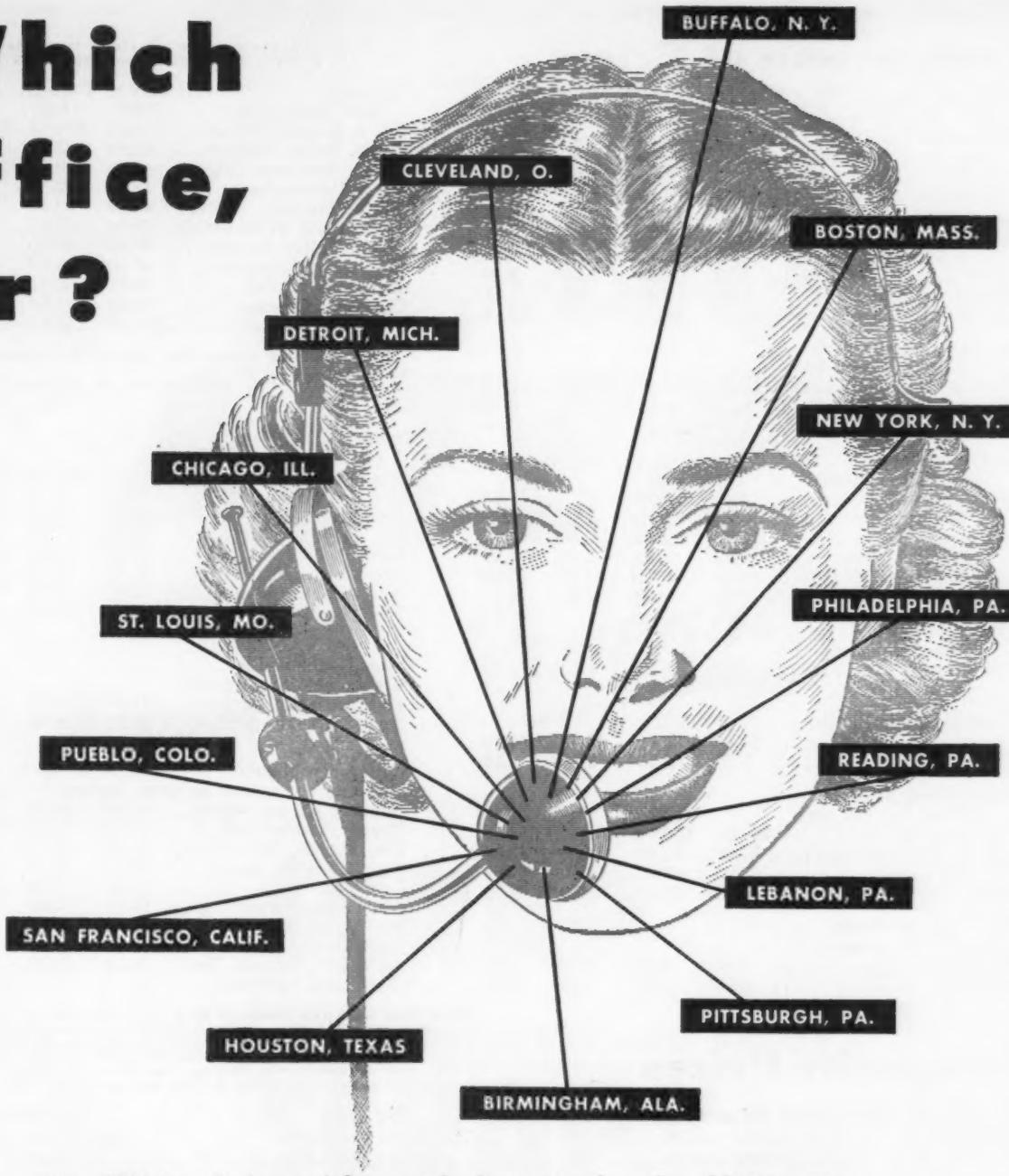
Del'd., buyer paying one-half freight:	
No. 1 hvy. melting	\$21.00
No. 2 hvy. melting	19.00
No. 1 bundles	21.00
No. 2 bundles	16.00
No. 3 bundles	13.00
Machine shop turn.	9.00
Elec. fur. 1 ft and under	28.00
No. 1 RR. hvy. melting	21.00
Scrap rails, random lgth.	22.00
No. 1 cupola cast	32.50 to 34.00

## Seattle

No. 1 hvy. melting	\$20.00


</tbl

# Which office, sir?



Since 1889 Luria Brothers and Company, Inc. have pursued a policy of better service made possible by years of "know how" and personnel who have the desire to please.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

## Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel:	July 4,	June 27,	June 6,	July 5,
(cents per pound)	1950	1950	1950	1949
Hot-rolled sheets	3.35	3.35	3.35	3.25
Cold-rolled sheets	4.10	4.10	4.10	4.00
Galvanized sheets (10 ga)	4.40	4.40	4.40	4.40
Hot-rolled strip	3.25	3.25	3.25	3.25
Cold-rolled strip	4.21	4.21	4.21	4.038
Plate	3.50	3.50	3.50	3.40
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302)	33.00	33.00	33.00	33.25

### Tin and Terneplate:

	(dollars per base box)			
Tinplate (1.50 lb) cokes	\$7.50	\$7.50	\$7.50	\$7.75
Tinplate, electro (0.50 lb)	6.60	6.60	6.60	6.70
Special coated mfg. terne	6.35	6.35	6.35	6.65

### Bars and Shapes:

	(cents per pound)			
Merchant bars	3.45	3.45	3.45	3.35
Cold-finished bars	4.145	4.145	4.145	3.995
Alloy bars	3.95	3.95	3.95	3.75
Structural shapes	3.40	3.40	3.40	3.25
Stainless bars (No. 302)	28.50	28.50	28.50	28.50
Wrought iron bars	9.50	9.50	9.50	9.50

### Wire:

	(cents per pound)			
Bright wire	4.50	4.50	4.50	4.15

### Rails:

	(dollars per 100 lb)			
Heavy rails	\$3.40	\$3.40	\$3.40	\$3.20
Light rails	3.75	3.75	3.75	3.55

### Semi-finished Steel:

	(dollars per net ton)			
Rerolling billets	\$54.00	\$54.00	\$54.00	\$52.00
Slabs, rerolling	54.00	54.00	54.00	52.00
Forging billets	63.00	63.00	63.00	61.00
Alloy blooms, billets, slabs	66.00	66.00	66.00	63.00

### Wire Rod and Skelp:

	(cents per pound)			
Wire rods	3.85	3.85	3.85	3.40
Skelp	3.15	3.15	3.15	3.25

Price advances over previous week are printed in Heavy Type; declines appear in Italic.

Pig Iron:	July 4,	June 27,	June 6,	July 5,
(per gross ton)	1950	1950	1950	1949
No. 2, foundry, Phila.	\$50.42	\$50.42	\$50.42	\$50.56
No. 2, Valley furnace	46.50	46.50	46.50	46.50
No. 2, Southern Cin'ti	49.08	49.08	49.08	45.47
No. 2, Birmingham	42.38	42.38	42.38	39.38
No. 2, foundry, Chicago	46.50	46.50	46.50	46.50
Basic del'd Philadelphia	49.92	49.92	49.92	49.74
Basic, Valley furnace	46.00	46.00	46.00	46.00
Malleable, Chicago	46.50	46.50	46.50	46.50
Malleable, Valley	46.50	46.50	46.50	46.50
Charcoal, Chicago	68.56	68.56	68.56	73.78
Ferromanganese	173.40	173.40	173.40	173.40

†The switching charge for delivery to foundries in the Chicago district is \$1 per ton.

‡Average of U. S. prices quoted on Ferroalloy page.

### Scrap:

Scrap:	(per gross ton)	Heavy melt'g steel, P'gh.	\$41.75	\$41.75	\$46.75	\$20.75
Heavy melt'g steel, Phila.	33.75	33.75	36.50	36.50	17.50	
Heavy melt'g steel, Ch'go	37.50	37.50	39.50	39.50	19.75	
No. 1 hy. com. sh't, Det.	37.50	37.50	43.50	43.50	12.75	
Low phosph. Young'n	44.25	44.25	46.25	46.25	21.25	
No. 1 cast, Pittsburgh	43.75	43.75	43.75	43.75	26.50	
No. 1 cast, Philadelphia	39.50	39.50	39.50	39.50	27.50	
No. 1 cast, Chicago	45.50	45.50	48.50	48.50	29.50	

### Coke: Connellsville:

Coke: Connellsville:	(per net ton at oven)	Furnace coke, prompt	\$14.25	\$14.25	\$14.25	\$14.25
Foundry coke, prompt	16.25	16.25	16.25	16.25	16.25	16.25

### Nonferrous Metals:

Nonferrous Metals:	(cents per pound to large buyers)	Copper, electro, Conn.	22.50	22.50	22.50	16.00
Tin, Straits, New York	79.50†	78.25*	78.00	78.00	\$1.03	
Zinc, East St. Louis	15.00	15.00	14.50	14.50	9.00	
Lead, St. Louis	10.80	11.30	11.80	11.80	11.85	
Aluminum, virgin	17.50	17.50	17.50	17.50	17.00	
Nickel, electrolytic	51.22	51.22	51.22	51.22	42.93	
Magnesium, ingot	21.50	21.50	21.50	21.50	20.50	
Antimony, Laredo, Tex.	24.50	24.50	24.50	24.50	38.50	

†Tentative. \*Revised.

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

### Pig Iron:

Pig Iron:	\$46.38 per gross ton	\$37.67 per gross ton
46.38	46.38	37.67
46.38	46.38	37.67
46.38	46.38	40.92
45.91	45.91	19.33

### Scrap Steel:

Scrap Steel:	\$37.67 per gross ton	\$19.17 per gross ton
37.67	37.67	19.17
40.92	40.92	19.17
19.33	19.33	19.17

High	Low	High	Low
\$46.38 Feb. 7	\$45.88 Jan. 3	\$40.92 June 6	\$26.25 Jan. 3
46.87 Jan. 18	45.88 Sept. 6	43.00 Jan. 4	19.33 June 28
46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar. 9
37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
\$23.61	\$23.61	19.17 Jan. 11	15.76 Oct. 24
23.61	23.61	\$19.17	\$19.17
23.61	23.61	19.17	19.17
\$23.61 Mar. 20	\$23.45 Jan. 2	\$22.00 Jan. 7	\$19.17 Apr. 10
23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
32.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

# ALTER

A NAME TO REMEMBER

IRON AND STEEL

# SCRAP

ALL GRADES OF STAINLESS and ALLOY

# SCRAP

Over 50 Years  
**ALTER**  
COMPANY

1700 ROCKINGHAM ROAD DAVENPORT 2, IOWA

Cast Iron  
Electric Furnace Grades  
Open Hearth  
Foundry Steel  
Sheet Iron for Baling  
Stainless Steel  
Non-Ferrous Metals

**IRON AGE**  
**STEEL  
PRICES**

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.  
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middle- town	Youngs- town	Bethle- hem	Buffalo	Consho- hocken	Johns- town	Spar- rows Point	Granite City	Detroit
<b>INGOTS</b> Carbon forging, net ton	\$53.00 <sup>1</sup>													\$50.00 <sup>11</sup>
Alloy, net ton	\$51.00 <sup>1-17</sup>													\$51.00 <sup>11</sup>
<b>BILLETS, BLOOMS, SLABS</b> Carbon, rerolling, net ton	\$53.00 <sup>1</sup>	\$53.00 <sup>1</sup>	\$53.00 <sup>1</sup>				\$57.00 <sup>1-3</sup>		\$53.00 <sup>3</sup>	\$58.00 <sup>26</sup>	\$53.00 <sup>3</sup>			
Carbon forging billets, net ton	\$63.00 <sup>1</sup>	\$63.00 <sup>1-4</sup>	\$63.00 <sup>1-8</sup>	\$63.00 <sup>4</sup>			\$63.00 <sup>2-5</sup>		\$63.00 <sup>3</sup>	\$65.00 <sup>26</sup>	\$63.00 <sup>3</sup>			\$66.00 <sup>11</sup>
Alloy, net ton	\$66.00 <sup>1-17</sup>	\$66.00 <sup>1-4</sup>	\$66.00 <sup>1</sup>		\$66.00 <sup>1-4</sup>		\$66.00 <sup>1-3</sup>	\$66.00 <sup>3</sup>	\$66.00 <sup>3</sup>	\$68.00 <sup>26</sup>	\$66.00 <sup>3</sup>			\$66.00 <sup>11</sup>
<b>PIPE SKELP</b>	3.15 <sup>1</sup>						3.15 <sup>1-4</sup>							
<b>WIRE RODS</b>	3.85 <sup>2-18</sup>	3.85 <sup>2-4-33</sup>	3.85 <sup>6</sup>	3.85 <sup>2</sup>			3.85 <sup>6</sup>			3.85 <sup>3</sup>	3.85 <sup>3</sup>			
<b>SHEETS</b> Hot-rolled (18 ga. & hvr.)	3.35 <sup>1-5-9</sup> 15	3.35 <sup>23</sup>	3.35 <sup>1-6-8</sup>	3.35 <sup>1-8</sup>			3.35 <sup>1-4-6</sup> 3.50 <sup>13</sup>		3.35 <sup>3</sup>	3.45 <sup>26</sup>	3.35 <sup>3</sup>			3.55 <sup>12</sup> 4.15 <sup>47</sup>
Cold-rolled	4.10 <sup>1-5-7</sup> 9.15		4.10 <sup>1-6-8</sup>	4.10 <sup>1-8</sup>		4.10 <sup>7</sup>	4.10 <sup>1-6</sup>		4.10 <sup>3</sup>		4.10 <sup>3</sup>	4.30 <sup>22</sup>	4.30 <sup>12</sup>	
Galvanized (10 gage)	4.40 <sup>1-9-15</sup>		4.40 <sup>1-8</sup>		4.40 <sup>4</sup>		4.65 <sup>6</sup> 4.75 <sup>44</sup>				4.40 <sup>3</sup>			
Enameling (12 gage)	4.40 <sup>1</sup>		4.40 <sup>1-8</sup>	4.40 <sup>4</sup>		4.40 <sup>7</sup>	4.40 <sup>6</sup> 4.90 <sup>76</sup>					4.60 <sup>22</sup>	4.70 <sup>12</sup>	
Long ternes (10 gage)	4.80 <sup>0-15</sup>		4.80 <sup>1</sup>			4.80 <sup>7</sup>	4.80 <sup>6</sup>							
Hi Str. low alloy, h.r.	5.05 <sup>1-5-9</sup>	5.05 <sup>1</sup>	5.05 <sup>1-6-8</sup>	5.05 <sup>1-8</sup>			5.05 <sup>1-4-6</sup> 13		5.05 <sup>3</sup>	5.05 <sup>26</sup>	5.05 <sup>3</sup>			5.25 <sup>12</sup>
Hi str. low alloy, c.r.	6.20 <sup>1-5-9</sup>		6.20 <sup>1-6-8</sup>	6.20 <sup>1-8</sup>			6.20 <sup>4-6-13</sup>		6.20 <sup>3</sup>		6.20 <sup>3</sup>			6.40 <sup>12</sup>
Hi str. low alloy, galv.	6.75 <sup>1</sup>													6.75 <sup>3</sup>
<b>STRIP</b> Hot-Rolled	3.25 <sup>5-7-9</sup> 28	3.25 <sup>3-66</sup>	3.25 <sup>1-6-8</sup>	3.25 <sup>6</sup>			3.25 <sup>1-4-6</sup> 3.50 <sup>13</sup>		3.25 <sup>3</sup>	3.35 <sup>26</sup>	3.25 <sup>3</sup>			3.45 <sup>12</sup> 4.05 <sup>47</sup>
Cold-rolled	4.15 <sup>5-7-9</sup> 4.50 <sup>63</sup>	4.30 <sup>8-66</sup>	4.30 <sup>8</sup>	4.15 <sup>2-8</sup>		4.15 <sup>7</sup>	4.15 <sup>4-6-18</sup> 49		4.15 <sup>3</sup>		4.15 <sup>3</sup>		4.35 <sup>12</sup> 4.75 <sup>18</sup> 4.95 <sup>47</sup>	
Hi str. low alloy, h.r.	4.95 <sup>9</sup>		4.95 <sup>1-6-8</sup>	4.95 <sup>6</sup>			4.95 <sup>1-4-6</sup> 13		4.95 <sup>3</sup>	4.95 <sup>26</sup>	4.95 <sup>3</sup>			5.15 <sup>12</sup>
Hi Str. low alloy, c.r.	6.20 <sup>9</sup>			6.20 <sup>2-5</sup>			6.20 <sup>4-6-13</sup>		6.40 <sup>3</sup>		6.40 <sup>3</sup>			6.40 <sup>12</sup>
<b>TINPLATE†</b> Cokee, 1.50-lb base box 1.25 lb, deduct 20¢	\$7.50 <sup>1-5</sup> 9.15		\$7.50 <sup>1-6-8</sup>				\$7.50 <sup>4</sup>					\$7.60 <sup>3</sup>	\$7.70 <sup>22</sup>	
Electrolytic 0.25, 0.50, 0.75 lb box														

Deduct \$1.15, 90¢ and 65¢ respectively from 1.50-lb coke base box price

<b>BLACKPLATE, 29 gage</b> Hollow ware enameling	5.30 <sup>1-5-15</sup>		5.30 <sup>1-6</sup>				5.30 <sup>4</sup>					5.40 <sup>3</sup>	5.50 <sup>22</sup>	
<b>BARS</b> Carbon steel	3.45 <sup>1-5-9</sup>	3.45 <sup>1-4-23</sup>	3.45 <sup>1-6-8</sup>	3.45 <sup>4</sup>	3.45 <sup>4</sup>		3.45 <sup>1-4-6</sup>		3.45 <sup>3</sup> 4		3.45 <sup>3</sup>			3.65 <sup>12</sup>
Reinforcing†	3.45 <sup>1-5</sup>	3.45 <sup>1</sup>	3.45 <sup>1-6-8</sup>	3.45 <sup>4</sup>			3.45 <sup>1-4-6</sup>		3.45 <sup>3</sup> 4		3.45 <sup>3</sup>	3.45 <sup>3</sup>		
Cold-finished	4.10 <sup>5</sup> 4.15 <sup>2-17</sup> 52.69.71	4.15 <sup>2-23</sup> 69.70	4.15 <sup>4-73</sup> 74	4.15 <sup>2-61</sup>	4.15 <sup>4-32-62</sup>		4.15 <sup>9-40-57</sup>		4.15 <sup>70</sup>					4.35 <sup>12</sup> 4.30 <sup>64</sup>
Alloy, hot-rolled	3.95 <sup>1-17</sup>	3.95 <sup>1-4-23</sup>	3.95 <sup>1-6-8</sup>		3.95 <sup>4</sup>		3.95 <sup>1-6-23</sup>	3.95 <sup>3</sup>	3.95 <sup>3</sup> 4		3.95 <sup>3</sup>			4.25 <sup>12</sup>
Alloy, cold-drawn	4.90 <sup>2-17</sup> 52.69.71	4.90 <sup>2-23</sup> 69.70	4.90 <sup>4-73</sup> 74	4.90 <sup>2-61</sup>	4.90 <sup>4-42-63</sup>		4.90 <sup>6-35-57</sup>	4.90 <sup>3</sup>	4.90 <sup>3</sup> 70					5.05 <sup>84</sup>
Hi str. low alloy, h.r.	5.20 <sup>1-5</sup>		5.20 <sup>1-6-8</sup>	5.20 <sup>4</sup>			5.20 <sup>1-6</sup>	5.20 <sup>3</sup>	5.20 <sup>3</sup>		5.20 <sup>3</sup>			5.40 <sup>12</sup>
<b>PLATE</b> Carbon steel	3.50 <sup>1-5</sup>	3.50 <sup>1</sup>	3.50 <sup>1-6-8</sup>	3.50 <sup>4</sup>			3.50 <sup>1-18</sup>		3.50 <sup>3</sup>	3.60 <sup>26</sup>	3.50 <sup>3</sup>	3.50 <sup>3</sup>		3.75 <sup>12</sup>
Floor Plates	4.55 <sup>1</sup>	4.55	4.55 <sup>3</sup>	4.55 <sup>6</sup>						4.55 <sup>26</sup>				
Alloy	4.40 <sup>1</sup>	4.40 <sup>1</sup>	4.40 <sup>1</sup>				4.40 <sup>13</sup>		4.40 <sup>26</sup>	4.40	4.40 <sup>3</sup>			
Hi Str. low alloy	5.35 <sup>1-5</sup>	5.35 <sup>1</sup>	5.35 <sup>1-3</sup>	5.35 <sup>4-8</sup>			5.35 <sup>6</sup>		5.35 <sup>26</sup>	5.35 <sup>3</sup>	5.35 <sup>3</sup>		5.80 <sup>12</sup>	
<b>SHAPES, Structural</b>	3.40 <sup>1-5-9</sup>	3.40 <sup>1-23</sup>	3.40 <sup>1-6-8</sup>					3.45 <sup>3</sup>	3.45 <sup>3</sup>		3.45 <sup>3</sup>			
Hi Str. low alloy	5.15 <sup>1-5</sup>	5.15 <sup>1</sup>	5.15 <sup>1-6-8</sup>				5.10 <sup>6</sup>	5.20 <sup>3</sup>	5.20 <sup>3</sup>		5.20 <sup>3</sup>			
<b>MANUFACTURERS' WIRE</b> Bright	4.50 <sup>2-5-18</sup> 33.34	4.50 <sup>2-4-12</sup> 33.34		4.50 <sup>2-77</sup>			4.50 <sup>6</sup>	Kokomo=4.60 <sup>30</sup>		4.50 <sup>3</sup>	4.60 <sup>3</sup>	Duluth=4.50 <sup>2</sup> Pueblo=4.75 <sup>14</sup>		
<b>PILING, Steel Sheet</b>	4.20 <sup>1-9</sup>	4.20 <sup>1</sup>							4.20 <sup>3</sup>					

Smaller numbers indicate producing companies. See key at right.  
Prices are in cents per lb unless otherwise noted. Extras apply.

IRON AGE

STEEL  
PRICES

INGOTS	Carbon forging, net ton
Alloy, net ton	
BILLETS, BLOOMS, SLABS	Carbon, rerolling, net ton
Carbon forging billets, net ton	
PIPE SKELP	
WIRE RODS	
SHEETS	Hot-rolled (18 ga. & lvr.)
Cold-rolled	
Galvanized (10 gage)	
Enameling (12 gage)	
Long ternes (10 gage)	
Hi Str. low alloy, h.r.	
Hi Str. low alloy, c.r.	
Hi Str. low alloy, galv.	
STRIP	
Hot-rolled	
Cold-rolled	
Hi Str. low alloy, h.r.	
Hi Str. low alloy, c.r.	
TINPLATE	Cokes, 1.50-lb base box 1.25 lb, deduct 20¢
Electrolytic	0.25, 0.50, 0.75 lb box

Deduct \$1.15, 90¢ and 65¢ respectively from 1.50-lb coke base box price

4.05 <sup>83</sup>	3.85 <sup>83</sup>	3.45 <sup>11</sup>	SF, LA=4.15 <sup>24</sup> LA=4.15 <sup>62</sup>	Atlanta=3.80 <sup>65</sup>
4.05 <sup>83</sup>	3.85 <sup>83</sup>	3.45 <sup>11</sup>	SF, S=4.20 <sup>62</sup> F=4.10 <sup>19</sup>	Atlanta=3.80 <sup>65</sup>
				Putnam, Newark=4.55 <sup>69</sup>
4.55 <sup>83</sup>	4.35 <sup>83</sup>		LA=5.00 <sup>62</sup> F=4.95 <sup>19</sup>	
				Newark <sup>59</sup> , Worcester <sup>2</sup> =5.20 Hartford=5.20 <sup>4</sup>
		5.20 <sup>11</sup>	F=6.25 <sup>19</sup>	
3.90 <sup>83</sup>	3.50 <sup>11</sup>		F=4.10 <sup>19</sup> S=4.40 <sup>62</sup> Geneva=3.50 <sup>10</sup>	Claymont=3.80 <sup>29</sup> Coatesville=3.80 <sup>21</sup> Harrisburg=3.85 <sup>35</sup>
			F=5.40 <sup>19</sup>	Harrisburg=4.55 <sup>35</sup>
		5.35 <sup>11</sup>	F=5.95 <sup>19</sup>	Coatesville=4.50 <sup>21</sup>
4.00 <sup>83</sup>	3.80 <sup>83</sup>	3.40 <sup>11</sup>	SF=3.95 <sup>63</sup> LA=4.00 <sup>24,62</sup>	Geneva=5.35 <sup>16</sup>
		5.15 <sup>11</sup>	F=4.00 <sup>19</sup> S=4.05 <sup>62</sup>	Phoenixville=3.30 <sup>66</sup> Geneva=3.40 <sup>16</sup>
5.10 <sup>83</sup>	4.90 <sup>83</sup>	4.50 <sup>11</sup>	SF, LA=5.45 <sup>24,62</sup>	Fontana=5.75 <sup>19</sup> Geneva=5.15 <sup>16</sup>
				Portsmouth=4.50 <sup>20</sup> Worcester=4.80 <sup>2</sup>

Notes: <sup>1</sup>Special coated mfg ternes deduct \$1.15 from 1.50-lb coke base box price.  
Can-making quality blackplate, 55 to 128-lb, deduct \$1.90 from 1.50-lb coke base box.  
<sup>2</sup>Straight lengths only from producer to fabricator.

KEY TO STEEL PRODUCERS

With Principal Offices

- 1 Carnegie-Illinois Steel Corp., Pittsburgh
- 2 American Steel & Wire Co., Cleveland
- 3 Bethlehem Steel Co., Bethlehem
- 4 Republic Steel Corp., Cleveland
- 5 Jones & Laughlin Steel Corp., Pittsburgh
- 6 Youngstown Sheet & Tube Co., Youngstown
- 7 Armco Steel Corp., Middletown, Ohio
- 8 Inland Steel Co., Chicago
- 9 Weirton Steel Co., Weirton, W. Va.
- 10 National Tube Co., Pittsburgh
- 11 Tennessee Coal, Iron & R. R. Co., Birmingham
- 12 Great Lakes Steel Corp., Detroit
- 13 Sharon Steel Corp., Sharon, Pa.
- 14 Colorado Fuel & Iron Corp., Denver
- 15 Wheeling Steel Corp., Wheeling, W. Va.
- 16 Geneva Steel Co., Salt Lake City
- 17 Crucible Steel Co. of America, New York
- 18 Pittsburgh Steel Co., Pittsburgh
- 19 Kaiser Steel Corp., Oakland, Calif.
- 20 Portsmouth Div., Detroit Steel Corp., Detroit
- 21 Lukens Steel Co., Coatesville, Pa.
- 22 Granite City Steel Co., Granite City, Ill.
- 23 Wisconsin Steel Co., South Chicago, Ill.
- 24 Columbia Steel Co., San Francisco
- 25 Copperweld Steel Co., Glassport, Pa.
- 26 Alan Wood Steel Co., Conshohocken, Pa.
- 27 Calif. Cold Rolled Steel Corp., Los Angeles
- 28 Allegheny Ludlum Steel Corp., Pittsburgh
- 29 Worth Steel Co., Claymont, Del.
- 30 Continental Steel Corp., Kokomo, Ind.
- 31 Rotary Electric Steel Co., Detroit
- 32 Laclede Steel Co., St. Louis
- 33 Northwestern Steel & Wire Co., Sterling, Ill.
- 34 Keystone Steel & Wire Co., Peoria, Ill.
- 35 Central Iron & Steel Co., Harrisburg, Pa.
- 36 Carpenter Steel Co., Reading, Pa.
- 37 Eastern Stainless Steel Corp., Baltimore
- 38 Washington Steel Corp., Washington, Pa.
- 39 Jessop Steel Co., Washington, Pa.
- 40 Blair Strip Steel Co., New Castle, Pa.
- 41 Superior Steel Corp., Carnegie, Pa.
- 42 Timken Steel & Tube Div., Canton, Ohio
- 43 Babcock & Wilcox Tuba Co., Beaver Falls, Pa.
- 44 Reaves Steel & Mfg. Co., Dover, Ohio
- 45 John A. Roebling's Sons Co., Trenton, N. J.
- 46 Simonds Saw & Steel Co., Fitchburg, Mass.
- 47 McLouth Steel Corp., Detroit
- 48 Cold Metal Products Co., Youngstown
- 49 Thomas Steel Co., Warren, Ohio
- 50 Wilson Steel & Wire Co., Chicago
- 51 Sweet's Steel Co., Williamsport, Pa.
- 52 Superior Drawn Steel Co., Monaca, Pa.
- 53 Tremont Nail Co., Wareham, Mass.
- 54 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
- 55 Ingersoll Steel Div., Chicago
- 56 Phoenix Iron & Steel Co., Phoenixville, Pa.
- 57 Fitzsimmons Steel Co., Youngstown
- 58 Stanley Works, New Britain, Conn.
- 59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
- 60 American Cladmetals Co., Carnegie, Pa.
- 61 Cuyahoga Steel & Wire Co., Cleveland
- 62 Bethlehem Pacific Coast Steel Corp., San Francisco
- 63 Follansbee Steel Corp., Pittsburgh
- 64 Niles Rolling Mill Co., Niles, Ohio
- 65 Atlantic Steel Co., Atlanta
- 66 Acme Steel Co., Chicago
- 67 Joslyn Mfg. & Supply Co., Chicago
- 68 Detroit Steel Corp., Detroit
- 69 Wyckoff Steel Co., Pittsburgh
- 70 Bliss & Laughlin, Inc., Harvey, Ill.
- 71 Columbia Steel & Shafting Co., Pittsburgh
- 72 Cumberland Steel Co., Cumberland, Md.
- 73 La Salle Steel Co., Chicago
- 74 Monarch Steel Co., Inc., Hammond, Ind.
- 75 Empire Steel Co., Mansfield, Ohio
- 76 Mahoning Valley Steel Co., Niles, Ohio
- 77 Oliver Iron & Steel Co., Pittsburgh
- 78 Pittsburgh Screw & Bolt Co., Pittsburgh
- 79 Standard Forging Corp., Chicago
- 80 Driver Harris Co., Harrison, N. J.
- 81 Detroit Tube & Steel Div., Detroit
- 82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
- 83 Sheffield Steel Corp., Kansas City
- 84 Plymouth Steel Co., Detroit
85. John A. Roebling's Sons Co., Trenton, N. J.

## STAINLESS STEELS

Product	Base prices, in cents per pound, f.o.b. producing point									
	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	12.75	13.50	15.00	14.50	22.75	18.25	20.00	11.25	13.75	11.50
Slabs, billets, rerolling	13.75	14.50	16.00	15.50	23.75	19.25	21.00	12.25	14.25	12.50
Slabs, billets, rerolling	17.00	18.25	20.25	19.25	30.25	24.50	26.75	15.60	18.50	15.25
Slabs, billets, rerolling	18.00	19.25	21.25	20.25	31.25	25.50	27.75	16.60	19.50	16.25
Forg. discs, die blocks, rings	30.50	30.50	33.00	32.00	49.00	35.50	41.00	24.50	25.00	25.00
Billets, forging	32.00	32.00	34.50	33.50	50.50	38.00	42.50	26.00	26.50	26.50
Billets, forging	24.25	24.25	26.25	25.50	39.00	29.00	32.75	19.50	20.00	20.00
Bars, wire, structural	25.75	25.75	27.75	27.00	40.50	30.50	34.25	21.00	21.50	21.50
Bars, wire, structural	28.50	28.50	31.00	30.00	46.00	34.00	38.50	23.00	23.50	23.50
Bars, wire, structural	30.00	30.00	32.50	31.50	47.50	35.50	40.00	24.50	25.00	25.00
Plates	32.00	32.00	34.00	34.00	50.50	39.50	44.00	26.00	26.50	26.50
Sheets	37.50	37.50	39.50	39.80	53.00	45.50	50.00	33.00	33.50	35.50
Sheets	39.00	39.00	41.00	41.00	54.50	47.00	51.50	34.50	35.00	37.00
Strip, hot-rolled	24.25	25.75	30.00	27.75	46.00	34.50	38.75	21.25	28.00	21.75
Strip, cold-rolled	25.50	27.00	31.25	29.00	47.25	35.75	40.00	22.50	29.25	23.00
Strip, cold-rolled	30.50	33.00	36.50	35.00	55.00	44.50	48.50	27.00	33.50	27.50
Plates	32.00	34.50	38.00	36.50	56.50	46.00	50.00	28.50	35.00	29.00

**STAINLESS STEEL PRODUCING POINTS**—Sheets: Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38, 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind., 67; Lockport, N. Y., 46. Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38; W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, 13; Butler, Pa., 7. Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67. Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28. Structural: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44. Plates: Brackenridge, Pa., 28; Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4. Forged discs, die blocks, rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28. Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, Pa., 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1.

## ELECTRICAL SHEETS

22 gage, HR cut lengths, f.o.b. mill

Cents per lb.

Armature	6.20
Electrical	6.70
Motor	*7.95
Dynamo	8.75
Transformer 72	9.30
Transformer 65	9.85
Transformer 58	10.55
Transformer 52	11.35

**PRODUCING POINTS**—Beech Bottom, W. Va., 18; Brackenridge, Pa., 28; Follansbee, W. Va., 63; Granite City, Ill., 22\*; add 0.20¢; Indiana Harbor, Ind., 8; Mansfield, Ohio, 75; Niles, Ohio, 64, 76; Vandergrift, Pa., 1; Warren, Ohio, 4; Zanesville, Ohio, 7.

## MERCHANT WIRE PRODUCTS

Base Column  
Pittsburgh, Calif.

To dealers, f.o.b. mill	106	125\$
Standard & coated nails*	116	139
Woven wire fence†	116	139
Fence posts, carloads†	116	..
Single loop bale ties	113	137
Galvanized barbed wire**	126	146
Twisted barbless wire	126	146

\* Pgh., Chi., Duluth; Worcester, 6 columns higher; Houston, 8 columns higher; Kansas City, 12 columns higher. † 15½ gage and heavier. \*\* On 80 rod spools, in carloads. ‡ Duluth, Joliet, Johnstown, 112.

Base per Pittsburg, 100 lb  
Calf.  
Merch. wire annealed \$5.35 \$6.30  
Merch. wire, galv. t. 5.60 6.55  
Cut nails, carloads† 6.75 ..  
‡ Add 30¢ at Worcester; 20¢ at Chicago; 10¢ at Sparrows Pt.  
† Less 20¢ to Jobbers.  
‡ Torrance, 126.

**PRODUCING POINTS** — Standard, Coated or galvanized nails, woven wire fence, bale ties, and barbed wire: Alabama City, Ala., 4; Atlanta, 65; Alquippa, Pa., (except bale ties), 5; Bartonville, Ill. (except bale ties), 34; Chicago, 4; Donora, Pa., 2; Duluth, 2; Fairfield, Ala., 11; Johnstown, Pa. (except bale ties), 3; Joliet, Ill., 2; Kokomo, Ind., 30;

Minnequa, Colo., 14; Monessen, Pa. (except bale ties), 18; Pittsburgh, Calif., 24; Portsmouth, Ohio, 20; Rankin, Pa. (except bale ties), 2; Sparrows Point (except woven fence), 3; Sterling, Ill., 33; San Francisco (except nails and woven fence), 14; Torrance, Calif. (nails only), 24; Worcester (nails only), 3; Houston (except bale ties), 83; Kansas City, 83. Fence Posts: Duluth, 2; Johnstown, Pa., 3; Joliet, Ill., 2; Minnequa, Colo., 14; Moline, Ill., 4; Williamsport, Pa., 51. Cut nails: Wheeling, W. Va., 15; Conshohocken, Pa., 26; Wareham, Mass., 53.

## RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb..... \$3.40  
Joint bars, per 100 lb..... 4.40  
Light rails, per 100 lb..... 3.75

Base Price

cents per lb

Track spikes†	5.60
Axles	5.25
Screw spikes	8.60
Tie plates	4.20
Pittsburg, Torr., Calif.; Seattle	4.35
Track bolts, untreated**	8.85
Track rods, heat treated, to railroads**	9.10

\*\* Minnequa, deduct 25¢. † Kansas City, 5.85¢.

**PRODUCING POINTS**—Standard rails: Bessemer, Pa., 1; Ensley, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Minnequa, Colo., 14; Steelton, 3. Light rails: All the above except Indiana Harbor and Steelton, plus Fairfield, Ala., 11; Johnstown, 3; Minnequa, 14.

Joint bars: Bessemer, Pa., 1; Fairfield, Ala., 11; Indiana Harbor, Ind., 8; Joliet, Ill., 1; Lackawanna, N. Y., 3; Steelton, Pa., 3; Minnequa, Colo., 14.

Track spikes: Fairfield, Ala., 11; Indiana Harbor, Ind., 6, 8; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 5; Chicago, 4; Struthers, 6; Youngstown, 4. Track bolts: Fairfield, Ala., 11; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 77, 78.

Axles: Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 79; Johnstown, Pa., 3; McKees Rocks, Pa., 1.

Tie plates: Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Pittsburgh, Calif., 24; Pittsburgh, 4; Seattle, 62; Steelton, Pa., 3; Torrance, Calif., 24; Minnequa, Colo., 14.

Numbers after producing points correspond to steel producers. See key on Steel Price page.

## PIPE AND TUBING

Base discounts, f.o.b. mills  
Base price about \$200.00 per net ton

## Standard, T &amp; C

Steel, Butt-weld*	Black	Galv
1/2-in.	40 1/2 to 38 1/2	21 to 19
3/4-in.	43 1/2 to 41 1/2	25 to 23
1-in.	46 to 44	28 to 26
1 1/4-in.	46 1/2 to 44 1/2	28 1/2 to 26 1/2
1 1/2-in.	47 to 45	29 to 27
2-in.	47 1/2 to 45 1/2	29 1/2 to 27 1/2
2 1/2-in.	48 to 46	30 to 28

## Steel, lapweld

2-in.	38	19 1/2
2 1/2 to 3-in.	42	23 1/2
3 1/2 to 6-in.	48 to 40	24 1/2 to 21 1/2

## Steel, seamless

2-in.	36	17 1/2
2 1/2 to 3-in.	39	20 1/2
3 1/2 to 6-in.	41	22 1/2

## Wrought Iron, buttweld

1/2-in.	26 1/2	56
3/4-in.	16 1/2	45
1 & 1 1/4-in.	10 1/2	36
1 1/2-in.	4 1/2	32 1/2
2-in.	4	32

## Wrought Iron, lapweld

2-in.	13 1/2	40
2 1/2 to 3 1/2-in.	11	35 1/2
4-in.	6	29 1/2
4 1/2 to 8-in.	8	31
9 to 12-in.	18	40 1/2

## Extra Strong, Plain Ends

Steel, buttweld		
1/2-in.	39 1/2 to 37 1/2	21 1/2 to 19 1/2
3/4-in.	43 1/2 to 41 1/2	25 1/2 to 23 1/2
1-in.	45 1/2 to 43 1/2	28 1/2 to 26 1/2
1 1/4-in.	46 to 44	29 to 27
1 1/2-in.	46 1/2 to 44 1/2	29 1/2 to 27 1/2
2-in.	47 to 45	30 to 29
2 1/2 to 3-in.	47 1/2 to 45 1/2	30 1/2 to 28 1/2

## Steel, lapweld

2-in.	37	19 1/2
2 1/2 to 3-in.	42	24 1/2
3 1/2 to 6-in.	44 1/2 to 41 1/2	27 to 24

## Steel, seamless

2-in.	35	17 1/2
2 1/2 to 3-in.	38	21 1/2
3 1/2 to 6-in.	42 1/2	25

## Wrought Iron, buttweld

1/2-in.	22	50
3/4-in.	15 1/2	43
1 & 1 1/4-in.	6 1/2	32
1 1/2-in.	5	29 1/2
2-in.	list	24 1/2
2 1/2 to 3-in.	11 1/2	32 1/2

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3 1/2-in. and larger four points higher discount (lower price) applies. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct.

\* Fontana, Calif., deduct 11 points from figures in left columns.

## BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut lengths 10 to 24 ft inclusive.

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb.  
(Metropolitan area delivery, add 20¢ to base price except Birmingham, San Francisco, Cincinnati, New Orleans, St. Paul (\*), add 15¢; Philadelphia, add 25¢).

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gauge)	Galvanized (10 gauge)	Hot-Rolled	Cold-Rolled			Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140 Ann.	Cold-Drawn, A 4615 As-rolled
Baltimore.....	5.15	6.39 <sup>1</sup>	6.55 <sup>2</sup>	5.59-	5.60 <sup>11</sup>	5.40-	5.60	5.59	6.10	9.00	9.00	11.12	11.40
Birmingham*	5.15 <sup>10</sup>	5.95	6.15 <sup>7</sup>	5.10	5.40	5.25	5.10	5.08	5.10	5.08	5.08	5.08	5.08
Benton.....	5.75	6.55 <sup>20</sup>	6.94 <sup>8</sup>	5.70	6.90-	6.08	5.75	5.60	6.10-	8.70-	8.50-	11.15	11.45
Buffalo.....	5.15	6.05	6.04	5.41	7.27	5.65	5.35	5.15	5.75	9.00	9.00	11.05	11.35
Chicago.....	5.15	6.20	6.85	5.10	6.80	5.40	5.25	5.10	5.05	9.25	9.55	10.70	11.00
Cincinnati*	5.42-	5.88-	6.39	5.35	5.78	5.64	5.35-	5.00-	9.00-	9.00-	11.05-	11.35-	11.35-
Cleveland.....	5.97	6.24	7.10	5.24	6.35	5.82	5.37	5.12	5.75	9.38	9.00	10.01	11.11
Detroit.....	5.33	6.06-	6.33	5.49	6.43-	5.59	5.64-	5.30	5.91	9.00	9.00	11.01	11.31
Houston.....	6.00	—	—	6.10	—	6.00	5.95	6.10	7.00	10.35-	10.50-	11.50	11.95
Indianapolis.....	—	—	—	—	7.36	—	—	—	6.15	—	—	—	—
Kansas City.....	5.75	6.55	7.45	5.70	6.95	6.00	5.85	5.70	6.35	9.00	10.15	11.30	11.60
Los Angeles.....	5.90	7.45	7.60 <sup>2</sup>	5.95	8.35 <sup>16</sup>	8.00	5.90	5.90	7.55	10.75	10.75	12.45	12.75
Memphis.....	5.93	6.68	—	5.98	6.80-	6.08	5.93	5.88	6.51	—	—	—	—
Milwaukee.....	5.29	6.09	6.94-	5.24	6.32	5.54	5.39	5.24	5.89	9.39	9.69	10.84	11.14
New Orleans*	5.50 <sup>1</sup>	6.75	—	5.55 <sup>1</sup>	6.20	5.65	5.55 <sup>1</sup>	5.55 <sup>1</sup>	6.75	—	—	—	—
New York.....	5.55	6.89 <sup>1</sup>	7.20 <sup>2</sup>	5.84	6.76	5.90	5.65	5.75	6.44	9.00	9.00	11.05	11.35
Norfolk.....	6.10 <sup>13</sup>	7.00	—	6.30 <sup>13</sup>	—	6.15 <sup>13</sup>	6.20 <sup>13</sup>	6.15 <sup>13</sup>	7.20 <sup>13</sup>	—	—	—	—
Philadelphia*	5.30	6.35	6.80	5.85	6.29	5.45	5.45	5.65	6.21	9.35	9.65	10.80	11.10
Pittsburgh.....	5.15	5.95	6.60	5.20	5.95-	5.35	5.25	5.10	5.75	9.25	9.55	10.70	11.00
Portland.....	6.00-	8.40 <sup>2</sup>	—	6.85 <sup>9</sup>	—	6.40 <sup>9</sup>	6.50	6.45-	8.60 <sup>14</sup>	12.00 <sup>18</sup>	11.60 <sup>18</sup>	—	—
Salt Lake City.....	5.85	6.70	—	7.45	8.75	8.10 <sup>3</sup>	5.90	7.35 <sup>8</sup>	8.75	—	—	—	—
San Francisco*	6.25 <sup>11</sup>	7.80 <sup>2</sup>	7.65 <sup>2</sup>	6.75 <sup>11</sup>	7.85 <sup>16</sup>	8.18 <sup>11</sup>	6.00 <sup>11</sup>	6.15 <sup>11</sup>	7.55	10.75	10.75	12.45	12.75
Seattle.....	6.60 <sup>4</sup>	8.15 <sup>2</sup>	8.40 <sup>2</sup>	6.85 <sup>4</sup>	—	6.35 <sup>4</sup>	6.20 <sup>4</sup>	6.35 <sup>4</sup>	8.50 <sup>14</sup>	—	11.60 <sup>18</sup>	—	13.60 <sup>18</sup>
St. Louis.....	5.48	6.28	7.18	5.43	6.68-	5.73	5.58	5.43	6.08	9.58	9.88	11.03	11.33
St. Paul*	5.71	6.51	7.41	5.88	6.15-	5.96	5.81	5.68	6.31	9.81	10.11	11.26	11.56

**BASE QUANTITIES:** (Standard unless otherwise keyed on prices.)  
Hot-rolled sheets and strip, hot rolled bars and bar shapes, structural shapes, plate, galvanized sheets and cold-rolled sheets: 2000 to 9999 lb. Cold-finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb.

All HR products may be combined to determine quantity bracket. All galvanized sheets may be combined to determine quantity bracket. CR sheets may not be combined with each other or with galv. sheets to determine quantity bracket.

Exceptions:

(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 to 5999 lb; (6) 1000 lb and over; (7) 500 to 1499 lb; (8) 400 lb and over; (9) 400 to 9999 lb; (10) 500 to 9999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 9999 lb; (16) 6000 lb and over; (17) up to 1999 lb; (18) 1000 to 4999 lb; (19) 1500 to 3499 lb; (20) CR sheets may be combined for quantity; (21) 3 to 24 bundles.

PIG IRON PRICES

Dollars per gross ton. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES						DELIVERED PRICES (BASE GRADES)							
Producing Point	Basic	No. 2 Foundry	Maleable	Bessemer	Low Phos.	Consuming Point	Producing Point	Rail Freight Rate	Basic	No. 2 Foundry	Maleable	Bessemer	Low Phos.
Bethlehem.....	48.00	48.50	49.00	49.50	—	Boston.....	Everett.....	\$0.50 Arb.	50.50	51.00	—	—	—
Birmingham.....	41.58	42.38	—	—	—	Boston.....	Steelton.....	6.90	—	—	—	—	60.90
Buffalo.....	46.00	46.50	47.00	—	—	Brooklyn.....	Bethlehem.....	4.29	52.79	53.29	53.79	—	—
Chicago.....	46.00	46.50	46.50	47.00	61.00	Cincinnati.....	Birmingham.....	6.70	48.50	49.08	—	—	—
Cleveland.....	46.00	46.50	46.50	47.00	—	Jersey City.....	Bethlehem.....	2.63	51.13	51.63	52.13	—	—
Duluth.....	46.00	46.50	46.50	47.00	—	Los Angeles.....	Geneva-Ironton.....	7.70	53.70	54.20	—	—	—
Eric.....	46.00	46.50	46.50	47.00	—	Mansfield.....	Cleveland-Toledo.....	3.33	49.33	49.83	50.33	54.33	—
Everett.....	—	50.50	51.00	—	—	Philadelphia.....	Bethlehem.....	2.39	50.39	50.89	51.39	51.89	—
Granite City.....	47.90	48.40	48.90	—	—	Philadelphia.....	Swedenland.....	1.44	49.44	49.94	50.44	50.94	—
Ironon, Utah.....	46.00	46.50	—	—	—	Philadelphia.....	Steelton.....	3.00	—	—	—	57.09	—
Pittsburgh.....	46.00	46.50	46.50	47.00	—	Rochester.....	Buffalo.....	2.63	48.53	49.13	49.63	—	—
Geneva, Utah.....	46.00	46.50	—	—	—	Geneva-Ironton.....	Geneva-Ironton.....	7.70	53.70	54.20	—	—	—
Sharpsville.....	46.00	46.50	46.50	47.00	—	Seattle.....	Geneva-Ironton.....	7.70	53.70	54.20	—	—	—
Steelton.....	46.00	46.50	46.00	46.50	54.00	St. Louis.....	Granite City.....	0.75 Arb.	48.65	49.15	49.65	—	—
Scranton, Ohio.....	46.00	46.50	—	—	—	Buffalo.....	Syracuse.....	3.58	49.58	50.08	50.58	—	—
Swedenland.....	46.00	46.50	49.00	49.50	—	—	—	—	—	—	—	—	—
Telco.....	46.00	46.50	46.50	47.00	—	—	—	—	—	—	—	—	—
Troy, N. Y.....	46.00	46.50	49.00	49.50	54.00	—	—	—	—	—	—	—	—
Youngstown.....	46.00	46.50	46.50	47.00	—	—	—	—	—	—	—	—	—

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 50¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese

content in excess of 1.00 pct. \$2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and \$1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.01 to 6.50 pct C/L per g.t., f.o.b. Jackson, Ohio—\$57.00; f.o.b. Buffalo, \$58.25. Add \$1.00 per ton for each additional 0.50 pct Si up to 17 pct.

Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add \$1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are \$1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus \$60.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, \$68.56. High phosphorus charcoal pig iron is not being produced.



## Having SLIDE RULE trouble?

When the problem is moving air or gas, turn to R-C dual-ability for accurate, dependable answers

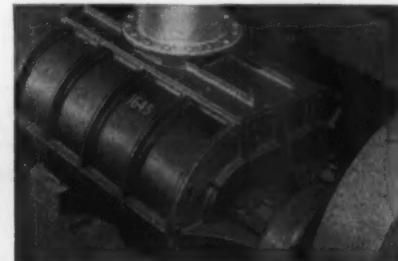
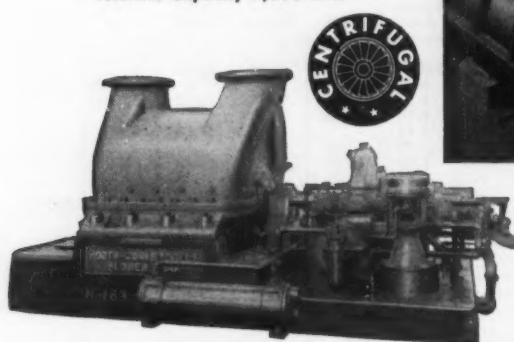
That's one job we know, inside-out. For almost a century, we've been air-and-gas specialists, exclusively. Without being immodest, we think our engineers are the best informed in the industry, on blowers, exhausters, gas pumps and related equipment.

They have an extensive line to draw on, too. They make unbiased recommendations between Centrifugals and Rotary Positives—we're the only company offering this *dual choice*. With capacities ranging from 5 cfm to 100,000 cfm, we can supply standard units closely matched to the job, for efficiency and economy.

As to how R-C equipment performs, our old-time, repeat customers are the best answer to that. They'll testify that you will reduce your buying and operating problems when you call on R-C air-and-gas specialists.

ROOTS-CONNERSVILLE BLOWER CORPORATION  
507 Ohio Avenue, Connersville, Indiana

Type H, 4-stage Centrifugal Gas Booster, driven by 240-hp steam turbine. Capacity 7,000 cfm.



Rotary Positive Cupola Blower with V-Belt drive, for melting gray iron and non-ferrous metals. Capacity 8,600 cfm.



# ROOTS-CONNERSVILLE

ONE OF THE DRESSER INDUSTRIES

### BOLTS, NUTS, RIVETS, SET SCREWS

#### Consumer Prices

(Bolts and nuts, f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)  
Base discount

#### Machine and Carriage Bolts

	Pct Off List	Less	Case C.
1/2 in. & smaller x 6 in. & shorter	27	35	
9/16 & 5/8 in. x 6 in. & shorter	29	40	
5/8 in. & larger x 6 in. & shorter	26	37	
All diam, longer than 6 in. ....	22	34	
Lag, all diam, longer than 6 in. ....	28	39	
Lag, all diam x 6 in. & shorter	30	41	
Plow bolts	40	—	

#### Nuts, Cold Punched or Hot Pressed

(Hexagons or Square)

1/2 in. and smaller	25	37
9/16 to 5/8 in. ....	23	35
5/8 to 1 1/2 in. inclusive	23	35
1 1/2 in. and larger	16	29

#### Semifinished Hexagon Nuts

(Less case lots)

	Pct Off List	Reg	Hvy	Lt
1/2 in. and smaller	41	35	41	
9/16 to 5/8 in. ....	36	30	36	
5/8 to 1 1/2 in. ....	31	27	33	
1 1/2 in. and larger	21	17	—	
In full case lots, 15 pct additional discount.				

#### Stove Bolts

Pct Off List

Packaged, steel, plain finish	63
Packaged, plated finish	50
Bulk, plain finish**	69*
• Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.	
** Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.	

#### Large Rivets

(1/2 in. and larger)  
Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa.	\$7.25
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#### Small Rivets

(7/16 in. and smaller)  
Pct Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	43
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#### Cap and Set Screws

(In bulk) Pct Off List

Hexagon head cap screws, coarse or fine thread, 1/4 in. thru 1/2 in. x 6 in., SAE 1020, bright, heat treated	60
1/2 in. through 1 1/2 in. x 6 in. and shorter high C heat treated	54
Milled studs	23
Flat head cap screws, listed sizes	24
Fillister head cap, listed sizes	43
Set screws, sq head, cup point, 1 in. diam and smaller x 6 in. and shorter	59

#### C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon	4.50¢
0.41 to 0.60 carbon	5.95¢
0.61 to 0.80 carbon	6.55¢
0.81 to 1.08 carbon	8.50¢
1.06 to 1.35 carbon	10.80¢
Worcester, add 0.30¢	

#### LAKE SUPERIOR ORES

(51.50% Fe; natural content, delivered lower lake ports) Per gross ton

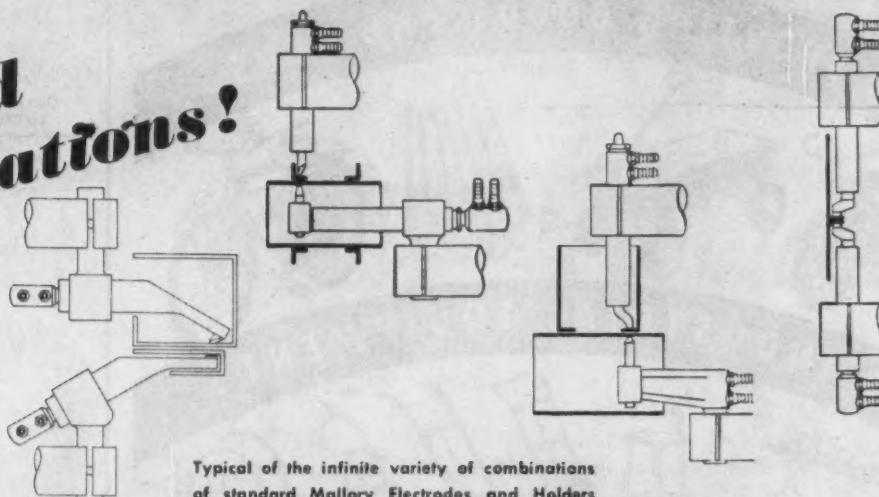
Old range, bessemer	\$8.10
Old range, nonbessemer	7.95
Mesabi, bessemer	7.85
Mesabi, nonbessemer	7.70
High phosphorus	7.70

After Jan. 25, 1950, increases or decreases in Upper Lake rail freight, dock handling charges and taxes are for buyers' account.

Prices Continued on Page 146

SER  
Cap  
Con  
Rect  
Spec  
S  
Res

# Value Beyond Expectations!



Typical of the infinite variety of combinations  
of standard Mallory Electrodes and Holders

## STANDARD RESISTANCE WELDING ITEMS CARRIED IN STOCK FOR IMMEDIATE SHIPMENT:

Fluted Electrodes  
Double Bend Electrodes  
Single Bend Electrodes  
Forged, Irregular Electrodes  
Cast Irregular Electrodes  
Swivel Electrodes  
Gun Welder Electrodes  
Elkonite\* Faced Electrodes  
Straight Holders  
Off-set Holders  
Bench Welder Holders  
Paddle Type Holders  
Universal Holders  
Low Inertia Holders  
Close Coupled Holders  
Seam Welder Wheels  
Seam Welder Shafts and Bushings  
Elkonite Rod, Bars and Inserts  
Alloy Rod and Bar Stock  
Taper and Thread Adapters  
Water Cooling Tubes  
External Cooling Chambers  
Tip Dressers and Files  
Water Cooling Hose, Clamps and  
Connections  
Alloy Castings  
Alloy Forgings  
Projection Butt and Flash Welding Dies

\*Reg. U. S. Pat. Off.

## Resistance Welding Electrodes, Holders, Dies, Rod and Bars, Castings, Forgings

### SERVING INDUSTRY WITH

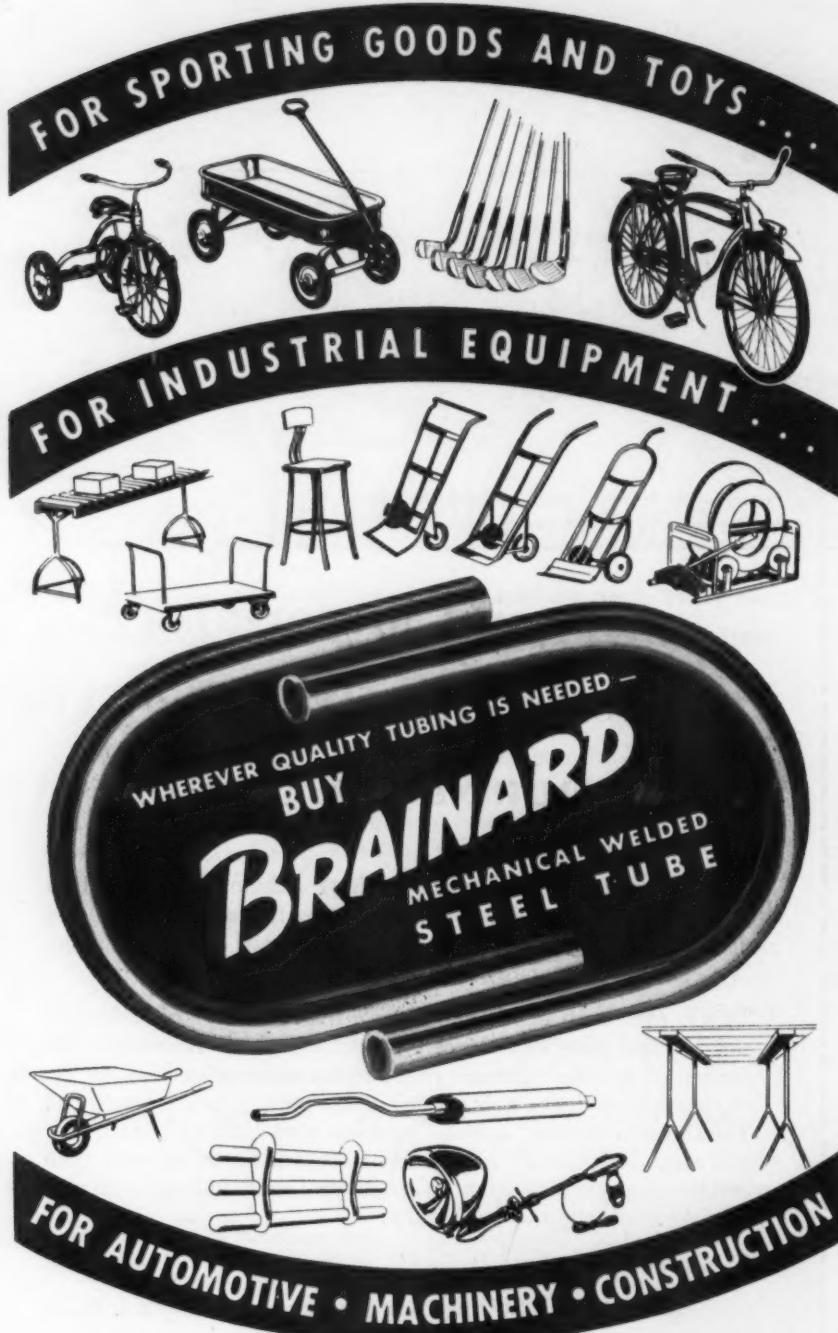
Capacitors	Contacts
Controls	Resistors
Rectifiers	Vibrators
Special Switches	Power Supplies
Resistance Welding Materials	

In Canada, made and sold by Johnson Matthey and Mallory, Limited  
110 Industry Street, Toronto 15, Ontario

P. R. MALLORY & CO., Inc.

# MALLORY

P. R. MALLORY & CO., Inc., INDIANAPOLIS 6, INDIANA



Because Brainard controls the quality of their tubing right from the ore they can build more value into their product. For this reason you get better tubing and better fabricated tube parts at less cost by specifying Brainard. For information write or call any Brainard office listed below.

## TUBING DIVISION

BRAINARD STEEL COMPANY

2307 LARCHMONT AVE., WARREN, OHIO

QUALITY CONTROLLED FROM ORE TO PRODUCT BY BRAINARD

Straight or Fabricated

SIZES: 1/2" to 4" — .025 to .165

SHARONSTEEL

There are Brainard sales offices in Atlanta, New York, Cincinnati, Pittsburgh, Buffalo, Chicago, Philadelphia, Detroit, Cleveland and Nashua, N. H. Sales Representatives: Sharonsteel Products Co. in Detroit and Grand Rapids, Mich.; Fred J. Reynolds, Davenport, Ia.

## ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed

Diam. in. in.	Length in. in.	Cents Per lb
<b>GRAPHITE</b>		
17, 18, 20	60, 72	17.00¢
8 to 16	48, 60, 72	17.00¢
7	48, 60	18.64¢
6	48, 60	19.65¢
4, 5	40	20.48¢
3	40	21.53¢
2 1/2	24, 30	22.05¢
2	24, 30	24.15¢
<b>CARBON</b>		
40	100, 110	7.65¢
35	65, 110	7.65¢
30	65, 84, 110	7.65¢
24	72 to 104	7.65¢
20	84, 90	7.65¢
17	60, 72	7.65¢
14	60, 72	8.16¢
10, 12	60	8.42¢
8	60	8.67¢

## CLAD STEEL

Base prices, cents per pound, f.o.b. mill

	Plate	Sheet
Stainless-carbon		
No. 304, 20 pct.		
Coatesville, Pa. (21) ..	26.50	
Washgtn, Pa. (39) ..	26.50	
Claymont, Del. (29) ..	26.50	
Conshohocken, Pa. (26) ..	22.50	
New Castle, Ind. (55) ..	24.00	
Nickel-carbon		
10 pct, Coatesville (26) ..	27.50	
Inconel-carbon		
10 pct, Coatesville (21) ..	36.00	
Monel-carbon		
10 pct, Coatesville (21) ..	29.00	
No. 302 Stainless-copper-stainless, Carnegie, Pa. (60) ..	75.00	
Aluminized steel sheets, hot dip, Butler, Pa. (7) ..	7.75	

\* Includes annealing and pickling, or sandblasting.

## TOOL STEEL

## F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	\$1.00
18	4	1	—	5	\$1.565
18	4	2	—	—	\$1.13
1.5	4	1.5	8	—	71.5¢
6	4	2	6	—	76.5¢
High-carbon-chromium					
Oil hardened manganese					
Special carbon					
Extra carbon					
Regular carbon					
Warehouse prices on east of Mississippi are 2 1/4¢ per lb higher. West of Mississippi, 4 1/4¢ higher.					

## COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa. ....	\$14.00 to \$14.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa. ....	\$16.00 to \$16.50
Foundry, oven coke	
Buffalo, del'd .....	\$24.00
Chicago, f.o.b. ....	21.00
Detroit, f.o.b. ....	20.40
New England, del'd .....	23.40
Seaboard, N. J., f.o.b. ....	22.00
Philadelphia, f.o.b. ....	21.25
Swedeland, Pa., f.o.b. ....	21.20
Painesville, Ohio, f.o.b. ....	21.90
Erie, del'd .....	\$21.04 to 21.25
Cleveland, del'd .....	22.62
Cincinnati, del'd .....	22.71
St. Paul, f.o.b. ....	21.00
St. Louis, del'd .....	22.18
Birmingham, del'd .....	20.20

## FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclar, Ill. Base price, per ton net; Effective CaF<sub>2</sub> content:

70% or more .....	\$37.00
60% or less .....	34.00

Prices Continued on Page 148



## FINISHED FORGINGS and ASSEMBLIES

*Ready for  
Installation*

National Forge offers you a complete service, under one responsibility, from making basic electric steel to the finish machining and assembly of your forged machine parts.

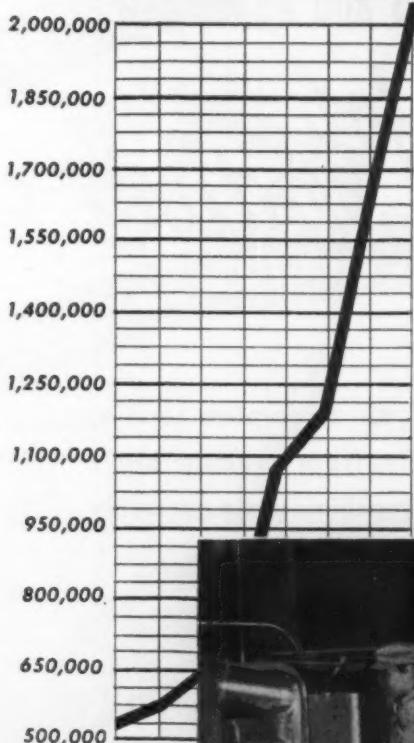
May we quote on your requirements?

NATIONAL FORGE  
AND ORDNANCE COMPANY

IRVINE, WARREN COUNTY, PA.

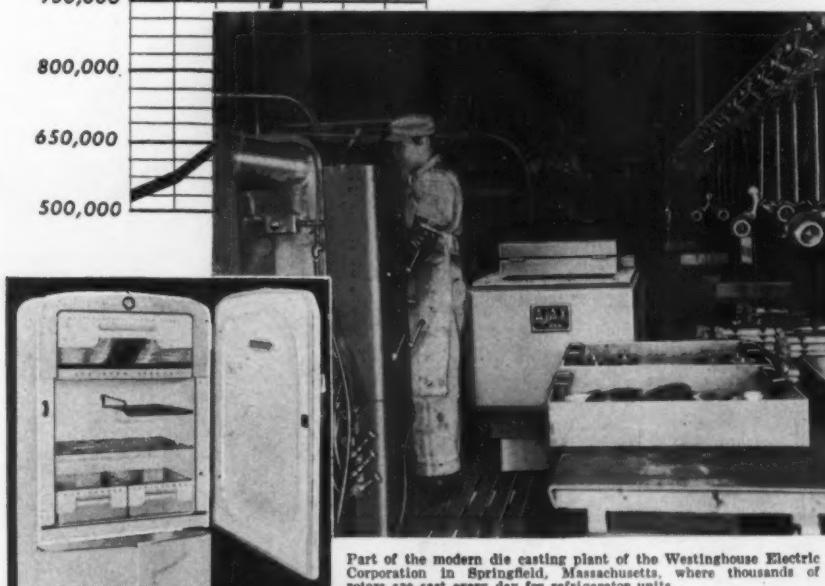
Steel Makers      Forgesmiths  
Heat Treaters      Machinists  
Machinery & Testing Equipment  
Manufacturers

# Over 2 Million



Electric Motors  
produced monthly  
in the U.S.A.  
-- more and more  
manufacturers are  
installing

**AJAX**  
ELECTRIC FURNACES  
to improve production.



Part of the modern die casting plant of the Westinghouse Electric Corporation in Springfield, Massachusetts, where thousands of rotors are cast every day for refrigerator units.

The New Westinghouse  
Refrigerator Model MF-7.

Cast two at a time, these aluminum motor rotors are better because of accurate temperature control and freedom from contamination made possible by Ajax Induction Furnaces.

has been achieved by casting the rotors from high purity aluminum. Prominent manufacturers have recognized the advantage of using Ajax-Tama-Wyatt induction furnaces for melting the aluminum prior to casting, because of the accurate temperature control and freedom from contamination with iron or silicon.

Write today for information about this modern method of increasing precision production.

AJAX ENGINEERING CORPORATION, Trenton 7, New Jersey

**AJAX**  **INDUCTION MELTING FURNACE**

AJAX ELECTRO METALLURICAL CORP., and Associated Companies  
AJAX ELECTRO THERMIC CORP., Ajax-Holmgren High Frequency Induction Furnaces  
AJAX ELECTRIC CO., INC., The Ajax-Holmgren Electric Still Bath Furnace  
AJAX ELECTRIC FURNACE CORP., Ajax-Wyatt Induction Furnaces for Melting

IRON AGE MARKETS & PRICES  
FOUNDED 1855 *Continued*

## REFRACTORIES

(F.o.b. works)

Fire Clay Brick	Carloads, Per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Ia. (except Salina, Pa., add \$5)	\$86.00
No. 1 Ohio	80.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 80.00	
No. 2 Ohio	72.00
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.50)	14.00

## Silica Brick

Mt. Union, Pa., Ensley, Ala.	\$86.00
Childs, Pa.	90.00
Hays, Pa.	91.00
Chicago District	95.00
Western Utah and Calif.	101.00
Super Duty, Hays, Pa., Athens, Tex., Chicago	106.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	15.00
Silica cement, net ton, bulk, Hays, Pa.	17.00
Silica cement, net ton, bulk, Ensley, Ala.	16.00
Silica cement, net ton, bulk, Chicago District	16.00
Silica cement, net ton, bulk, Utah and Calif.	22.50

## Chrome Brick

Per Net Ton

Standard chemically bonded, Balt., Chester	\$69.00
--	---------

## Magnesite Brick

Standard, Baltimore	\$91.00
Chemically bonded, Baltimore	80.00

## Grain Magnesite

St.  $\frac{3}{4}$ -in. grains

Domestic, f.o.b. Baltimore, in bulk fines removed	\$56.00 to \$57.00
Domestic, f.o.b. Chewelah, Wash., in bulk	33.00
in sacks	38.00

## Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢	\$12.25
---	---------

## METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.4¢ to 9.0¢
Canadian sponge iron, del'd, in East	10.00¢
Domestic sponge iron, 98+%	
Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	36.0¢ to 89.5¢
Electrolytic iron unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	70.0¢ to \$1.35
Aluminum	29.00¢
Brass, 10 ton lots	27.75¢ to 31.25¢
Copper, electrolytic	9.25¢ plus metal value
Copper, reduced	9.75¢ plus metal value
Cadmium, 100-199 lb	\$2.95
Chromium, electrolytic, 99% min., and quantity	\$3.50
Lead	18.50¢
Manganese	52.00¢
Molybdenum, 99%	\$2.65
Nickel, unannealed	75.5¢
Nickel, annealed	81.5¢
Nickel, spherical, unannealed	78.5¢
Silicon	34.00¢
Solder powder	6.5¢ to 8.5¢ plus met. value
Stainless steel, 302	75.00¢
Tin	11.00¢ plus metal value
Tungsten, 99%	\$2.90
Zinc, 10 ton lots	20.50¢ to 23.85¢

## CAST IRON WATER PIPE

Per net ton

6 to 24-in., del'd Chicago	\$91.80 to \$95.30
6 to 24-in., del'd N. Y.	91.00 to 92.00
6 to 24-in., Birmingham	78.00 to 82.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	\$108.50 to \$113.00
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.	

Prices Continued on Page 150

# MOLTEN METAL

won't affect **LUMNITE\***  
heat-resistant floors . . .



WHEN 2800°F. molten metal occasionally spills from lift-truck ladles onto this foundry floor, Lumnite heat-resistant concrete withstands the thermal shock. The 1750-sq.-ft. floor is constructed with a 5 1/4-inch-thick slab of Lumnite-trap rock heat-resistant concrete and a 3/4-inch topping of tough, wear- and heat-resisting Lumnite-emery concrete. This Lumnite heat-resistant concrete floor made possible a change-over from dirt floors . . . permitted handling ladles with lift-trucks. Such concrete floors made with Lumnite calcium-aluminate cement may be quickly and easily installed with a minimum of outage time, because Lumnite concrete reaches service strength in 24 hours or less. For further information write to Lumnite Division, Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, New York.



#### Time Saved, Cost Cut

in installing the bed for this 300-ton hydraulic press. Bed is 8' by 1 1/2' thick. The press was moved, foundation dug out of dirt floor, new foundation poured with Lumnite and ordinary concrete aggregate bed, and the press put back in place in less than 24 hours! Time off the job was kept to bare minimum. And maintenance costs are next to nothing for durable Lumnite concrete.

Heat-resistant floor and hydraulic press bed at Minneapolis-Moline Co., Hopkins Plant, Minneapolis, Minn.

#### SPECIFY CASTABLE REFRactories MADE WITH LUMNITE

\* "LUMNITE" is the registered trade mark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company.

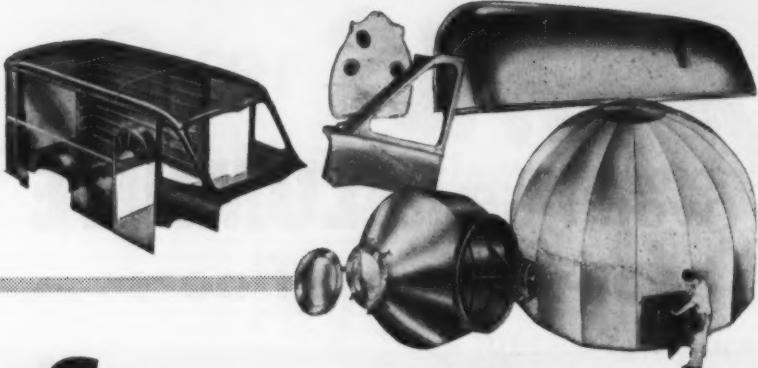
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**LUMNITE**



FOR REFRactory CONCRETE

NBC SUMMER SYMPHONY CONCERTS—Sponsored by U. S. Steel Subsidiaries—Sunday Evenings—June to September



# Start right!...

TO SAVE TIME AND DOLLARS

*with a bid from BRANDT*

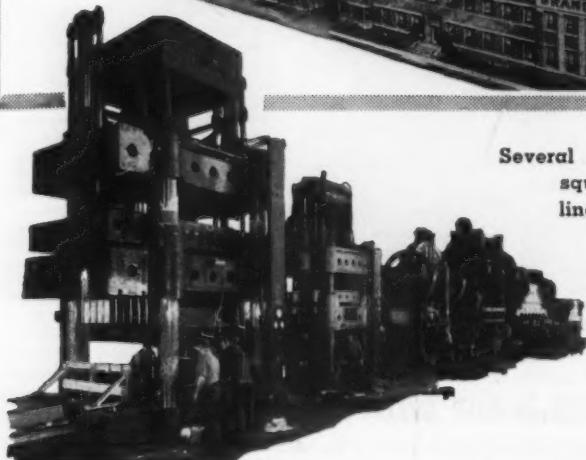
## FOR CONTRACT MANUFACTURE OF

**FERROUS & NON-FERROUS  
METAL STAMPINGS  
HEAVY WELDMENTS  
PRESSED STEEL SHAPES  
COMPLETE ASSEMBLIES**

Write for file No. 505 of helpful working information. Complete facilities.



Extensive Facilities—Wide Range—Exacting Specifications—Rigid Inspection—Precision Workmanship—On-the-Dot Deliveries.



Several hundred thousand square feet of streamlined production—strategically located near steel mills, in the midst of major rail, water and highway transportation.

**When It's Gotta Fit . . . Brandt Measures Up!**

**CHARLES T. BRANDT, inc.**  
1700 RIDGELY ST.  
BALTIMORE 30, MD.

**BRANDT**  
BALTIMORE

IRON AGE MARKETS & PRICES  
FOUNDED 1855

Continued

### FERROALLOYS

#### Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size.	
F.o.b. Birmingham	\$174
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont.	\$172
F.o.b. Johnstown, Pa.	\$174
F.o.b. Sheridan, Pa.	\$172
F.o.b. Etna, Clairton, Pa.	\$175
\$2.00 for each 1% above 82% Mn, penalty, \$2.15 for each 1% below 78%.	
Briquettes—Cents per pound of briquet, delivered, 66% contained Mn.	
Carload, bulk	10.45
Ton lots	12.05

#### Spiegeleisen

Contract prices gross ton, lump, f.o.b.	
16-19% Mn	19-21% Mn
3% max. Si	3% max. Si
Palmerton, Pa.	\$64.00
Pgh. or Chicago	65.00
	\$66.00
	66.00

#### Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.	
96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.	
Carload, packed	35.5
Ton lots	37.0

#### Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.	
Carloads	28
Ton lots	30
Less ton lots	32

#### Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn.	18.18¢
--	--------

#### Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.	
Carloads	Ton
0.07% max. C, 0.06% P, 90% Mn	25.25
0.10% max. C	24.75
0.15% max. C	24.25
0.30% max. C	23.75
0.50% max. C	23.25
0.75% max. C, 7.00% max. Si	25.10
	20.25
	22.10
	23.30

#### Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.	
Carload bulk	8.95
Ton lots	10.60
Briquet, contract basis carlots, bulk delivered, per lb of briquet	10.20
Ton lots	11.90

#### Silvery Iron (electric furnace)

SI 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$77.00 gross ton, freight allowed to normal trade area. SI 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$73.50. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 for each 0.50% Mn over 1%.	
Carload bulk	8.95
Ton lots	10.60

#### Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.	
96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

#### Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 1 lb Si briquets.	
Carload, bulk	6.30
Ton lots	7.90

#### Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.	
25% Si	17.00
50% Si	11.30
90-95% Si	13.50

#### Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.	
Cast Turnings	Distilled
\$2.05	\$2.95
Less ton lots	2.40
	3.30
	4.55

Prices Continued on Page 152



## Isn't this a pretty kettle of fish?

**SURVEYS** reveal an appalling misunderstanding among young people of the "facts of business life." For example, a poll was made among seniors in certain high schools which showed that they believe business profits are "over 50%" of the sales dollar, where actually profits average less than 8%. These students also think that stockholders receive 24% of the sales dollar, where actually it runs less than 3%.

Isn't this a pretty kettle of fish?

A greater part of the 8% of the sales dollar is reinvested in the business to expand and improve plant facilities which protects employment and creates new jobs for more workers.

Such ignorance is alarming. It is unfair to the young people themselves and dangerous to America's future. Such misconceptions open the door to socialism, communism and all the fantasies of the handout or "something-for-nothing" state of the economic dreamers.

Our school teachers say they want authentic information on the business system and how it works. Only business itself can supply the facts. You as a business leader in your community must share the responsibility for this misunderstanding. It is our civic duty to help overcome this misconception of everyday economics in the minds of our youth today.

### The Youngstown Sheet and Tube Company

General Offices--Youngstown 1, Ohio  
Export Offices--500 Fifth Avenue, New York

MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS



ELECTROLYTIC TIN PLATE - COKE TIN PLATE - WIRE - COLD FINISHED CARBON AND ALLOY BARS - PIPE AND TUBULAR PRODUCTS - CONDUIT - RODS - SHEETS - PLATES - BARS - RAILROAD TRACK SPIKES.

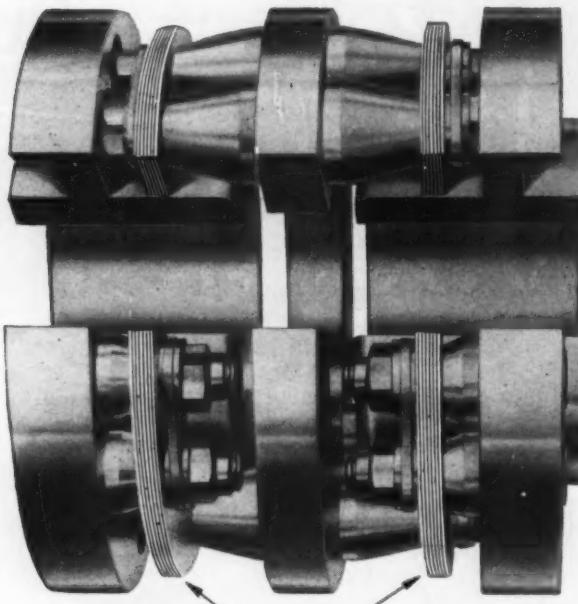
# THOMAS Flexible ALL METAL COUPLINGS

FOR POWER TRANSMISSION • REQUIRE NO MAINTENANCE

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes:  $\frac{1}{2}$  to 40,000 HP — 1 to 30,000 RPM.

Specialists on Couplings for more than 30 years



PATENTED FLEXIBLE DISC RINGS

**BACKLASH  
FRICTION  
WEAR and  
CROSS-PULL  
are eliminated  
LUBRICATION IS  
NOT REQUIRED!**

THE THOMAS PRINCIPLE GUARANTEES  
PERFECT BALANCE UNDER ALL  
CONDITIONS OF MISALIGNMENT.

• • •

NO MAINTENANCE PROBLEMS.

• • •

ALL PARTS ARE  
SOLIDLY BOLTED TOGETHER.



Write for the latest reprint of our Engineering Catalog.

THOMAS FLEXIBLE COUPLING CO.  
WARREN, PENNSYLVANIA

IRON AGE MARKETS & PRICES  
FOUNDED 1855  
Continued

#### Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max Si.)

0.06% C	28.75	0.20% C	27.75
0.10% C	28.25	0.50% C	27.50
0.15% C	28.00	1.00% C	27.25
2.00% C			27.00
65-69% Cr, 4-9% C			20.50
62-66% Cr, 4-6% C, 6-9% Si			21.35

#### High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

#### S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25
Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.	
Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

#### Chromium Metal

Contract prices, per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% Max. C	\$1.09
0.50% max. C	1.05
.00 min. C	1.04

#### Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 20.50¢ per lb of contained Cr plus 11.30¢ per lb of contained Si.

Bulk 1-in. x down, 20.65¢ per lb contained Cr plus 11.50¢ per lb contained Si.

#### Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.	
Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

#### Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.	
Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

#### CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.	
Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.	
Ton lots	19.75
Less ton lots	21.00

#### V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	15.75¢
Less ton lots	17.00¢

#### Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.00¢
Ton lots to carload packed	18.00¢
Less ton lots	19.50¢

#### SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe,  $\frac{1}{4}$  in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

*Prices Continued on Page 154*



**ready to  
serve you**

Crucible's 23 warehouses and pools stand ready to meet your every specialty steel requirement. When schedules are tight and time is too short for a mill shipment, take advantage of these completely stocked Crucible warehouses. Let Crucible's immediate delivery lighten your inventory load.

If you're out of stock, or don't need a mill-sized shipment, check with Crucible. Make the Crucible warehouse near you your stock supply. Come in to your Crucible warehouse, see for yourself the complete stocks, and how well prepared we are to serve you. Be sure to make full use of Crucible's alert metallurgical service, it's freely available to you. **CRUCIBLE STEEL COMPANY OF AMERICA**, Chrysler Building, New York 17, N. Y.

*Complete stocks maintained of*  
**High Speed Steel . . . AISI Alloy, Machinery, Onyx Spring  
 and Special Purpose Steels . . . ALL grades of Tool Steel (including  
 Die Casting and Plastic Die Steel, Drill Rod, Tool  
 Bits and Hollow Drill Steel) . . . Stainless Steel (Sheets, Bars,  
 Wire, Billets, Electrodes)**

**CRUCIBLE**

first name in special purpose steels

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Steel sheets packed for export are tied securely with Gerrard Round Steel Strapping. Stacked bundles slide over each other easily without breaking straps.

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Gerrard Steel Straps come in a wide range of gauges and can be used to reinforce packages of every size and weight from light parcel post bundles to carload shipments of steel plate and pipe.

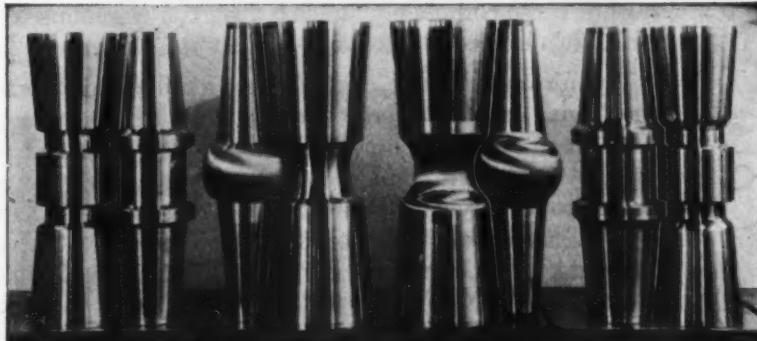
Find out how the use of Gerrard Round Steel Strapping can help your packaging operations. The services of Gerrard Engineers are available to you free of charge. Send for a free copy of *The Blue Book of Packaging*. **Gerrard Steel Strapping Company, 4705 Richmond Street, Chicago, Ill.**



## GERRARD ROUND STEEL STRAPPING

UNITED STATES STEEL

## ARDCOR FORMING ROLLS



★ These Forming Rolls, made of ARDCORLOY\*—a special alloy steel, were designed and manufactured by ARDCOR for one of America's leading Manufacturers (name on request).

\*PRODUCTION PROVEN—30% more footage!

### What are YOUR Roll Forming Requirements?

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#### Other Ferroalloys

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	7.65¢
Ton lots	9.05¢
Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo	90¢
Ferrocolumbium, 50-60%, 2 in x D, contract basis, delivered, per pound contained Cb.	
Carload	\$2.50
Ton lots	3.55¢
Ferro-Tantalum-columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in x D, per lb of contained Cb plus Ta	\$2.67
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo	\$1.13
Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$3 unitage, per gross ton	\$65.00
10 tons to less carload	75.00
Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	\$1.28
Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	\$1.40
Less ton lots	\$1.45
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton	\$167.00
Ferrotungsten, standard, lump or $\frac{1}{4}$ x down, packed, per pound contained W, 5 ton lots, delivered	\$2.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.	
Openhearth	\$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Molybdc oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa.	95¢
bags, f.o.b. Washington, Pa., Langeloth, Pa.	94¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk, lump	11.00¢
Ton lots, bulk, lump	11.50¢
Less ton lots, lump	12.25¢
Vanadium pentoxide, 88-92% $V_2O_5$ , contract basis, per pound contained $V_2O_5$	\$1.20
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.	
Carload, bulk	6.60¢

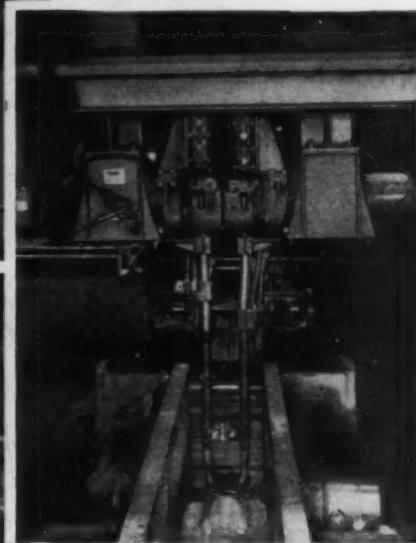
#### Boron Agents

Contract prices per lb of alloy, del. Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	\$4.25
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, Ti 15-21%, B 1-3%, Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed	
Ton lots, per pound	10.00¢
Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, Ton lots	\$1.20
F.o.b. Wash., Pa.; 100 lb, up	
10 to 14% B	.75
14 to 19% B	1.20
19% min. B	1.50
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 75	45¢
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.	
Ton lots	\$1.46
Less ton lots	1.57
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	\$1.80
Silcaz, contract basis, delivered.	
Ton lots	45.00¢



Left — This welding gantry in a prominent steel mill is the first application of the new Cleveland Tramrail stabilized hoist principle for welding purposes.

Below — The welding heads supported by the stabilized hoist, travel without sway or vibration and automatically apply a straight continuous and accurate welding bead.



# Stabilized Hoist PROVIDES ~

## VIBRATION-FREE TRAVEL FOR UNION MELT WELDING

The first application of a Cleveland Tramrail stabilized hoist for automatic welding by the Union Melt Process has proven completely successful. The stabilized hoist eliminates all vibration and pendulum motion at the welding heads, permitting the laying of straight, perfect welds.

The two welding heads are secured to the load bar of the hoist. The hoist in turn is supported by the Cleveland Tramrail gantry crane. The stabilized hoist which remains absolutely rigid in any position because of the unique triangular hoisting rope arrangement, can be adjusted to any height within 4'0"

limits. Welds can be made of any length up to the length of the crane runway.

Welding speed may be varied from 4 to 80 inches per minute by changing the gantry travel speed by means of push buttons on the pendant control cable. A tachometer on the cable just above the buttons keeps the operator informed of the welding speed.

The gantry crane with stabilized hoist is lighter and easier to manipulate than the usual heavy structural type of welding travel equipment. It is simple to adjust, convenient to use and very flexible in application to different kinds of work.

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**are Air-Cooled**

Air-Cooling, as developed and perfected by Wisconsin Motor Corporation engineers, has these important advantages for the power user:

1. Greatest freedom from cooling chores and troubles. More Service FROM the engine, less service TO the engine; fewer Man-Hours lost; more H.P. Hours on the job.
2. Most efficient cooling at all engine speeds and all temperatures, from sub-zero to tropical highs. The engine never runs out of AIR!
3. Lowest maintenance cost. Integrally cast flywheel fan eliminates all cooling "accessories" . . . nothing to get out of order, wear out, or require replacement.
4. Lighter engine weight and greater compactness . . . for most convenient portability and greatest installation adaptability as power components on original equipment.

Every Wisconsin Engine from the smallest to the largest (3 to 30 hp., single cylinder, 2-cylinder and 4-cylinder) has all the advantages of dependable AIR-COOLING, plus heavy-duty design and construction throughout.

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• News of Industry •

**Lead, Zinc Workers Boost  
Manhour Productivity by 11 Pct**

Washington—Lead and zinc production per man-hour rose 8 pct in 1948 and 3 pct in 1949, reports by the Bureau of Labor Statistics show. Although man-hour output last year was 15 pct below 1939 levels, it still was an improvement from the low point in 1946.

**Contributing Factors**

On the other hand, man-hour output for copper remained unchanged in 1949 following a drop of 4 pct in 1948. Nevertheless, the figures were still 6 pct above 1939 and 9 pct above 1935 when figures first were available.

Part of the general improvement in productivity has been due to the closing of high-cost mines following expiration of premium prices. But other major factors have been increased mechanization, availability of skilled workers, and improved recovery techniques.

**Complete Research Building**

Los Angeles—McCulloch Motors Corp.'s new research building has been completed, announces Robert P. McCulloch, president. Soundproofed, the building is adjacent to the main plant, has 7500 sq ft of floor space and contains seven engine test cells.

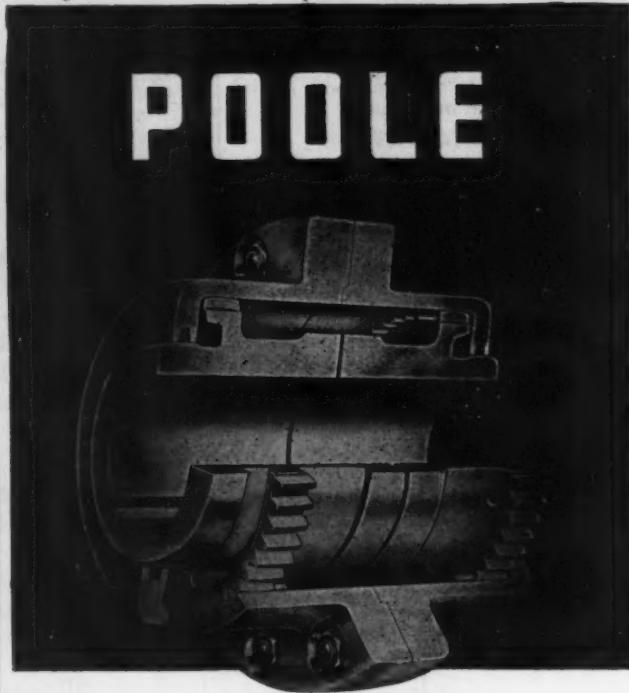
Five of the cells house dynamometers for engine testing and two cells will be used for endurance and fuel studies on an engine developed for the Army by the firm. Of functional design, the building has glass brick window walls and facilities for remote control mixing of fuel.

**Meetings to Have Local Slant**

Atlanta, Ga.—A departure from featuring national authorities of the metalworking field in their conventional programs will be stressed in 1950-51 technical meetings to be held by the Georgia chapter of the American Society of Metals. It is planned to present a series of eight meetings with a "Metalworking-Southeast" theme.

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are included in Our Improved Portable Sclerometer Model D-1. This efficient Single Scale tester registers Brinell-Shore values under otherwise inaccessible conditions. 100% portable for field and field work, dead soft metals or superhard steel either of brittle or thin cross sections. Non-destructive, accurate, speedy, always ready and fail-proof.

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WHEELING STEEL CORPORATION

WHEELING, WEST VIRGINIA

**AIR COMPRESSOR**

1000 Cu. Ft. Worthington "Feather Valve," 18" x 11" x 14" two stage with 185 HP synchronous motor on shaft.

**AUTOMATIC**

4 $\frac{1}{2}$ " Conomatic 4 spindle, serial No. 2191K with reel, chip conveyor, extra equipment.

**BORING MILLS**

4 $\frac{1}{2}$  bar Lucas No. 33. Table 46" x 64" Max. height 36", Max to outboard support 11'.

100" Niles Bement Pond. Extra heavy type. 2 swivel heads, power rapid traverse, 35 HP direct current motor.

**BROACH**

15 ton 36" stroke American vertical duplex surface with tilting type workholder.

**DRILL**

42 spindle, No. B16 Natco multiple with 18" x 48" drilling area and two box tables.

**GEAR HOBBER**

Type T Barber Colman. Designed for either straight or taper splines, helical or spur gears. Also type A and Nos. 3 & 12 Barber Colmans.

**GRINDERS**

6" x 18", No. 10 Brown & Sharpe "Electric Hydraulic" Three with and two without spindle oscillation. New 1940 and 1941.

10" x 36" Norton type C hydraulic with hydraulic quick in-feed. Serial No. C16458, new in 1942.

10" x 72" Norton type C hydraulic made at factory to swing 14". Serial No. C1750, new in 1944.

23" x 36" Norton type C with mechanical table traverse, hydraulic quick in-feed. Serial No. C18281, new 1943.

**LATHE TURRET**

No. 2FU Foster Fastermatic Serial No. 2FU529, new in 1944. Quite a little tooling.

**MILLERS**

Cincinnati Hydromatic Sizes: 3-24, 34-36, 4-36, 4-48, 5-48, 56-72 and 56-90.

**PRESSES**

1000 ton, No. 666 Toledo knuckle joint Coining. 2 $\frac{1}{2}$ " stroke, 18" shut height, bed 37" F to B x 31" R to L.

350 ton Clearing Crankless, model F1350-42, serial No. 45-11155P, new 1945. 20" stroke, 28" shut height, 36" x 42" bed.

600 ton Hamilton No. 2316 $\frac{1}{2}$  eccentric shaft forging. Stroke 4"; shut height 16" bed 28" F to B x 23 $\frac{3}{4}$ " R to L.

No. 506 Bliss on inclined legs with double roll feed and scrap cutter. About 126 tons. 3" stroke, 11 $\frac{1}{2}$ " shut height.

1000 ton Baldwin Southwark "Hy-Speed" hydraulic. 20" stroke, 56" daylight, bed 42" F to B x 54" R to L.

**UPSETTERS**

2" National. Serial No. 13213. Has suspended slides with long overarm guide. Has 15 HP motor.

4" Ajax. Serial No. 3156. Has twin drive gears, suspended slides, self contained backshaft, 30 HP motor.

**MILES MACHINERY CO.**  
**SAGINAW, MICH.**

# The Clearing House

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

**Detroit Business** — There has been a noticeable increase in used machinery sales in this area during the past 60 days. Actively moving are: Large and small presses; brakes and shears; broaches; milling machines; drills; shapers; and other toolroom equipment. Opinion of the industry is that, barring an unexpected break in auto production, the present high volume should continue for another 30 to 60 days.

**Detroit Prices** — Active demand for most types of equipment in the Detroit area has resulted in recent modest price advances. Advancing costs of steel and labor are expected ultimately to be reflected in additional rises, first, in new machinery and, later, in used and rebuilt items.

**San Diego NISA Meets** — Marle G. Smith of Wynn's Friction Proofing Oil Co. recently addressed the San Diego chapter of the National Industrial Service Assn. at Langhorst's Cafe. Mr. Smith spoke on the topic: "Lubrication and Oil Developments." At this meeting, the group elected its new officers for 1950-51.

At a previous meeting, presiding officer Frank W. Sloan introduced Joseph Durkee of Bossman Fuse Co. who spoke on the topic: "Motor Protective Devices—Fusetrons, Fusestats, and Adapters."

**NISA Opinion** — The membership of the National Industrial Service Assn. unhappy about the recent widespread curtailment of postal service, feels that a lot of money could be saved if the Post Office were reorganized on a business-like basis. Fred Wipperman, executive director, told the NISA that this reorganization could not be put through by executive order. It requires an act of Congress.

Mr. Wipperman pointed out that two bills have been pending for

some time to improve the efficiency of the Post Office Dept. They are S.2212 and S.2213. He is urging all NISA members to prod their Senators for some action to: (1) Provide the Post Office Dept. with a business-like administration; and (2) to take it out of politics.

**Cleveland Market** — Used machinery dealers in the Cleveland area are still enjoying a strong demand. However, a lull in orders is expected to coincide with the start of the plant vacation period that gets under way with the Fourth of July holiday, and continues for about 3 weeks.

Particularly in demand are sheet metal forming equipment, presses, press brakes, shears, tool room equipment, heavy lathes, planers and boring mills.

**Chicago Market** — Used machinery business in the Chicago area is remaining steadily good and is much better than the same period last year. With steel and manufacturing operations running at a high level the demand for used machinery is holding up well.

Long deliveries quoted on some types of new machinery are forcing some manufacturers to buy in the used machinery market. Another factor contributing to favorable business conditions is the buying and storing of used machinery by West Coast aircraft manufacturers in anticipation of increased government orders.

**Electrical Catalog** — Newly revised 16-p. catalog of large electric re-builder lists complete line including motors, transformers, starters, controllers, blowers, brakes, electroplaters, circuit breakers, frequency changers, gear reducers, hoists, generators, MG sets, pumps, rectifiers, welders, and many others. All items are guaranteed for one year. *Electric Generator & Motor Co.*

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